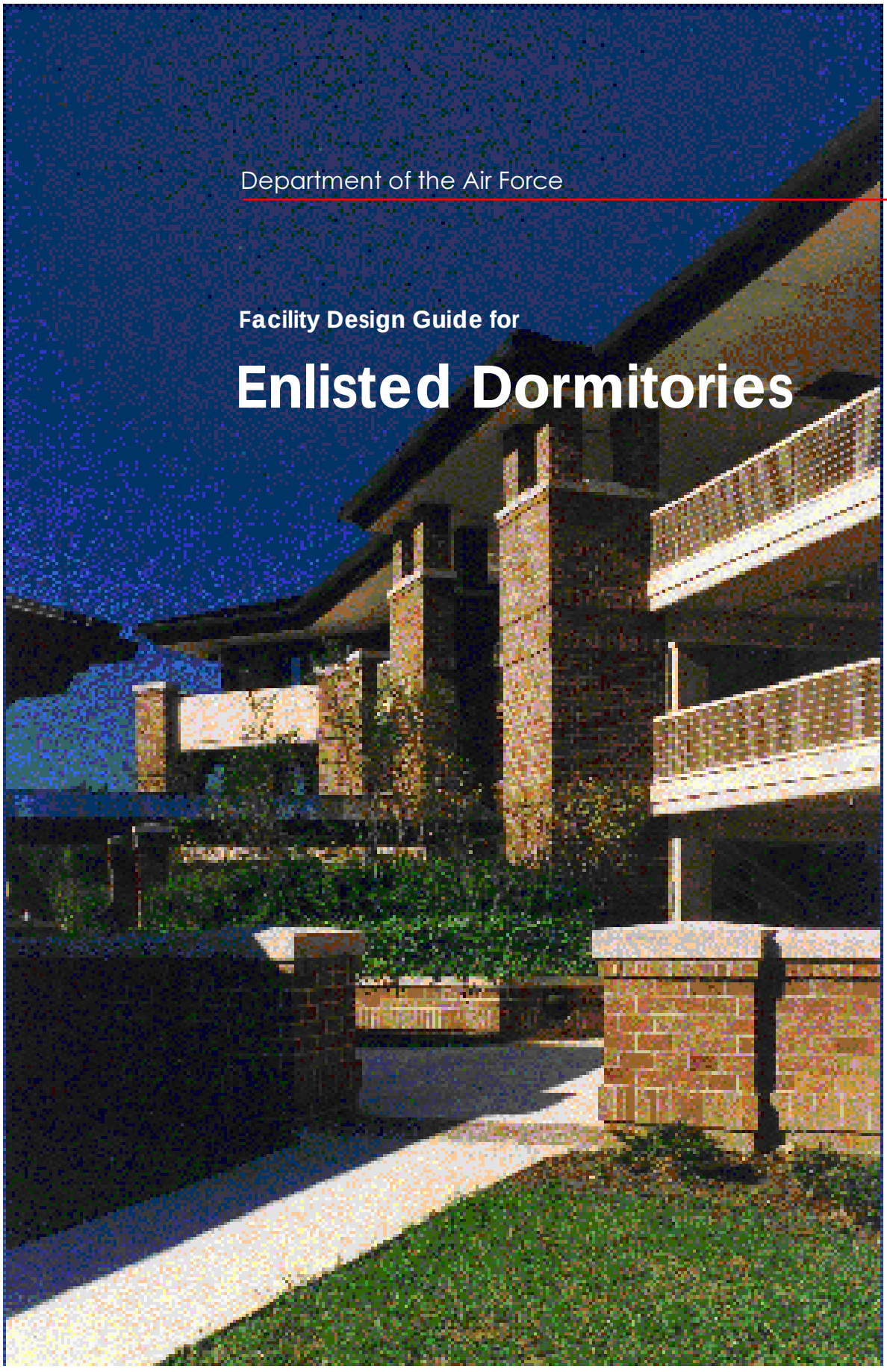
Department of the Air Force

Facility Design Guide for

Enlisted Dormitories



June 1997

CHAPTER 1: Introduction

CHAPTER 2: Programming

CHAPTER 3: Overall Project Design

CHAPTER 4: Functional Area and Space Criteria

CHAPTER 5: Vision 2020

Chapter 1
Introduction
A. Purpose

1. Contents

This design guide provides the basic criteria to plan, program and design Air Force enlisted permanent party dormitories. It presents guidance for development of enlisted dormitories taking into account local program operations and requirements. This guide expands upon and details the principles of two prefacing documents: the Commander's Guide for Installation Development and Airmen Communities. The guide also takes into account the preliminary findings of the Airmen's Community Survey conducted by the Air Force and the Army. The criteria herein applies to new enlisted dormitories and major enlisted dormitory renovations. At time of printing, separate design standards that apply to basic trainee barracks, pipeline student dormitories, and transient visiting airmen's quarters are under development.

This design guide provides guidance on the new Office of the Secretary of Defense (OSD) dormitory design standard, called the "1+1" standard because it features two private sleeping rooms. The Secretary of Defense approved the new standard on 6 November 95, and the Military Services were given authority to submit FY 96 and later MILCON unaccompanied housing projects with 1+1 standards. This guide incorporates the latest 1+1 design guidance found in draft OSD guidance and the HQ USAF/CE policy letter dated 16 February 95. As additional guidance is received from OSD and Air Staff, it will be included in updates of this guide.

2. Use and Intentions

This document is for use by:

- Base Civil Engineers
- Community Planners
- Programmers
- Housing Managers
- Major Command and Headquarters
- Architects
- Landscape architects
- Interior designers
- Engineers.

This guide is intended to promote a better understanding of enlisted dormitory requirements and design criteria.

3. Quality

Air Force facilities project quality by their appearance, ambiance, and their fulfillment of functional requirements and mission objectives. Quality is derived from a professional commitment by users, planners, programmers, and designers to achieve understated excellence through the delivery of complete and usable facilities. To achieve quality results, the proposed enlisted dormitory must satisfy the design intent, be easily maintained and present a positive image of the Air Force in its care-taker role of personnel as well as the environment.

4. Goal

This design guide serves to provide a better understanding of the many issues involved in quality housing for our unaccompanied enlisted personnel. It also promotes teamwork in the project development process.

B. Scope and Customers

1. Application

This Enlisted Dormitory Design Guide is applicable to all projects in the continental United States and overseas. It applies to new facilities and renovation projects. It provides criteria for determining:

- Program requirements
- Site evaluation and planning
- Facility design
- Landscape design
- Interior design

2. Limitations

This document provides information needed to produce a program or a conceptual design for a specific project. Use this guide in conjunction with other Air Force and Department of Defense documents that give related guidance. Unique design requirements of a specific project are addressed individually at the local level. This design guide is not a substitute for programming research by the designers, and it recognizes that the major commands have their own special requirements for their dormitories. It does, however, establish minimum design standards that must be followed. Designers are encouraged to exceed these standards where appropriate.

3. Criteria Development

A number of diverse groups have an interest in the delivery of quality enlisted dormitory facilities. Each has their own criteria for what is important, and each plays a vital role in establishing design criteria. The following is a list of these participants:

- Unaccompanied Enlisted Personnel
- Senior Enlisted Advisors
- 1st Sergeants
- Commanders
- Designers
- Operations and Maintenance Personnel
- Housing Managements Personnel

4. Project Development Stages

Project Initiation

Information required for preparation of DD Form 1391, which initiates project development, is found in this design guide. This includes the functions, the space allowances, overall building size, site evaluation, and special factors to consider in developing cost estimates. This guide provides data and criteria needed at each stage of the Air Force project development process.

Site Selection

This is generally part of the comprehensive planning process. Guidance for this selection is provided in Chapter 2, Site Evaluation.

Program Definition

The Requirements Document/Project Management Plan (RAMP) provides the design agent and the designer with information used in negotiating the design contract and completing the project definition phase of the project. The information in this design guide provides the basis for developing the RAMP. This includes the space planning guidance found in Chapter 2 plus the site design, building design and building systems concepts in Chapter 3. Unique local requirements concerning building program and design criteria also are included in the RAMP.

Design

Design drawings and data are normally prepared in the following sequence: project definition (10-20% design), preliminary (35-65% design), prefinal (95% sesign), and final working drawings (100% design). Often, when project definition is approved, preliminary design submittals are omitted and the designers are directed to proceed to prefinals. Project definition designs must conform to the overall project design considerations in Chapter 3. Commands must provide copies of all concept designs for enlisted dormitory projects with the new 1+1 standard to HQ AFCEE/DG. Include typical module plans, overall building plans, and module furnishing layouts. Show critcical dimensions and calculations reflecting compliance with 1+1 design criteria. These concept submissions will allow the Air Force Design Group to build a library of good 1+1 designs which will be crossfed to MAJCOMs and the Air Staff.

Chapter 2
Programming

A. Functions

The following basic functional activities must be addressed in enlisted personnel dormitories. These three basic functional categories are interactive, and designers must fully understand the relationships between the categories. The designer must take a holistic approach to creating a fully integrated facility. The three basic functional categories are:

1. Residential

- Sleeping
- Personal hygiene
- Personal study
- Food preparation and dining
- Personal storage
- Indoor relaxation
- Personal cooking and dining

2. Recreation/Community

- Television viewing
- Fitness/workout rooms
- Room games
- Outdoor sports
- Outdoor relaxation areas (These include individual and group activities.)

3. Service

- Laundry
- Mail delivery
- Vending
- Bulk storage
- Administrative support

B. Parameters

1. Planning Considerations

Planning the facility space program must take the following items into consideration:

- The current and projected resident population served by the proposed facility
- The potential for retention and renovation of existing facilities
- The need for additions versus complete new construction projects
- Existing community facilities on base and their adequacies relative to current and future needs

2. Proximity

Locate dormitories within a resonable distance of all community facilities, such as dining facilities, postal service centers, base exchanges, and commissaries. While most airmen in the United States have cars, many in overseas locations do not. Programmers must address the capacity of existing community facilities and accommodate any additional requirements incurred by the proposed dormitory increase. The proximity of dormitories to community services must be balanced with the need for quietness and privacy.

C. Allowances, Types, and Modules

1. Established Criteria

The area and occupancy requirements listed in Table 1 are construction standards, not assignment standards. There is currently no direct correlation between assignment standards and construction standards. Programmers must establish the anticipated number of occupants and the grade mix as the first step in developing a dormitory design. See AFH 32-1084, latest edition, for space allowances for Air Force Enlisted Dormitories, category code 721-312, Enlisted Personnel Permanent Party/PCS Student Dormitory.

Construction Standards

Grade:	E1 - E4
Net Living Area per Person:	11 m2 (118 SF)
Maximum number of persons per module	2 (1 per side)
Kitchen and bath configuration	Semi-private (shared by 2)

Table 1. Construction Standards

Note: At time of publication, assignment standards were not finalized. E-5s and above will likely be housed off-base. This guide therefore focuses on grades E-1 through E-4.

Career E-4s are allowed a minimum of 12.5 m^2 (135 SF) net living area in a private room configuration in existing dormitories. Career E-4s are afforded this additional space in recognition of their long-term commitment to the Air Force. This is an assignment standard only and must not be used to program or construct new dormitories.

New enlisted dormitories must satisfy the new construction requirements cited in Table 1. Note that the net living area per person in Table 1 is neither a minimum or maximum but must be met exactly, or to the greatest extent possible in the case of a major renovation. Assignment standards will most likely change before any changes occur for construction standards.

Enlisted dormitory major renovation projects must satisfy the construction standards to the maximum extent possible. Deviations are often necessary due to column locations, load bearing walls, or other pre-existing conditions. Where deviations are required a waiver must be obtained from HQ USAF/ILEH.

2. Recomended Spaces and Sizes

Dormitories fall into three general facility types: Type A provides access to the living units from interior double-loaded corridors, Type B provides access to the living units from exterior balconies or sidewalks, and Type C provides access to the units in a "garden apartment" arrangement. Figures 2 through 10 show typical modules for each type of facility. These are the basic building blocks from which enlisted dormitory programs are developed. **These designs are not mandatory standards, but are provided to serve as examples and to illustrate critical design issues. The module layout may vary provided the required net living area, minimum dimensional clearances, and maximum gross building area conform.** These modules are based on a standard of 22 m^2 (236 SF) net living area per module, and should be designed to readily convert to a private apartment as proposed in Vision 2020. See Chapter 5.

3. Net Living Area

Net living area is generally defined as the floor area of the living/bedroom space, measured to the inside face of the room walls as indicated by the shaded areas on Figures 1 through 9.

Provide a total of 11 m^2 (118.4 SF) net living area in each room (22 m^2 or 236 SF total for each module). Note that this is neither a minimum or maximum but must be met exactly, except in major dormitory renovations. The width of a living/bedroom area should not be less than 2800 mm (9'-4"); a minimum width of 3048 mm (10 ft.) is recommended. It is often impossible or impractical to satisfy this exact area and minimum width requirement when doing major renovation of an existing dormitory. When such occasions arise, the net living area may be increased up to 5%, or 11.55 m^2 (124 square feet). In no case should the net living area per side of a module be less than 11 m^2.

A generally good method of estimating the net living area is to measure the ceiling area of the living/bedroom space.

Items <u>included</u> in net living area calculations are:

- All door swings that encroach upon the living/bedroom area (typical in Type B dormitories).
- Mechanical equipment such as heat/air-conditioning units, radiators, and base board heaters.

Items <u>excluded</u> from net living area calculations are:

- Items extending from floor to ceiling, which have been <u>boxed-in</u> and extend into the room from the wall plane (such as columns, pilasters, vertical pipes and air ducts.)
- Where vanities occur within the living/bedroom area, exclude the area occupied by the vanity from the net living area calculation.
- Closets and wardrobes are no longer included as net living area.

See Figures 1 through 10 for examples of net living area.

Countless configurations are possible in the design of modules, and it is impossible to describe all configurations in this guide. The method of measuring net living area for intricate designs may require interpretation by MAJCOM or HQ AFCEE/DCD. Where it is necessary to deviate from this criteria, MAJCOMs must obtain a waiver from HQ USAF/ILEH.

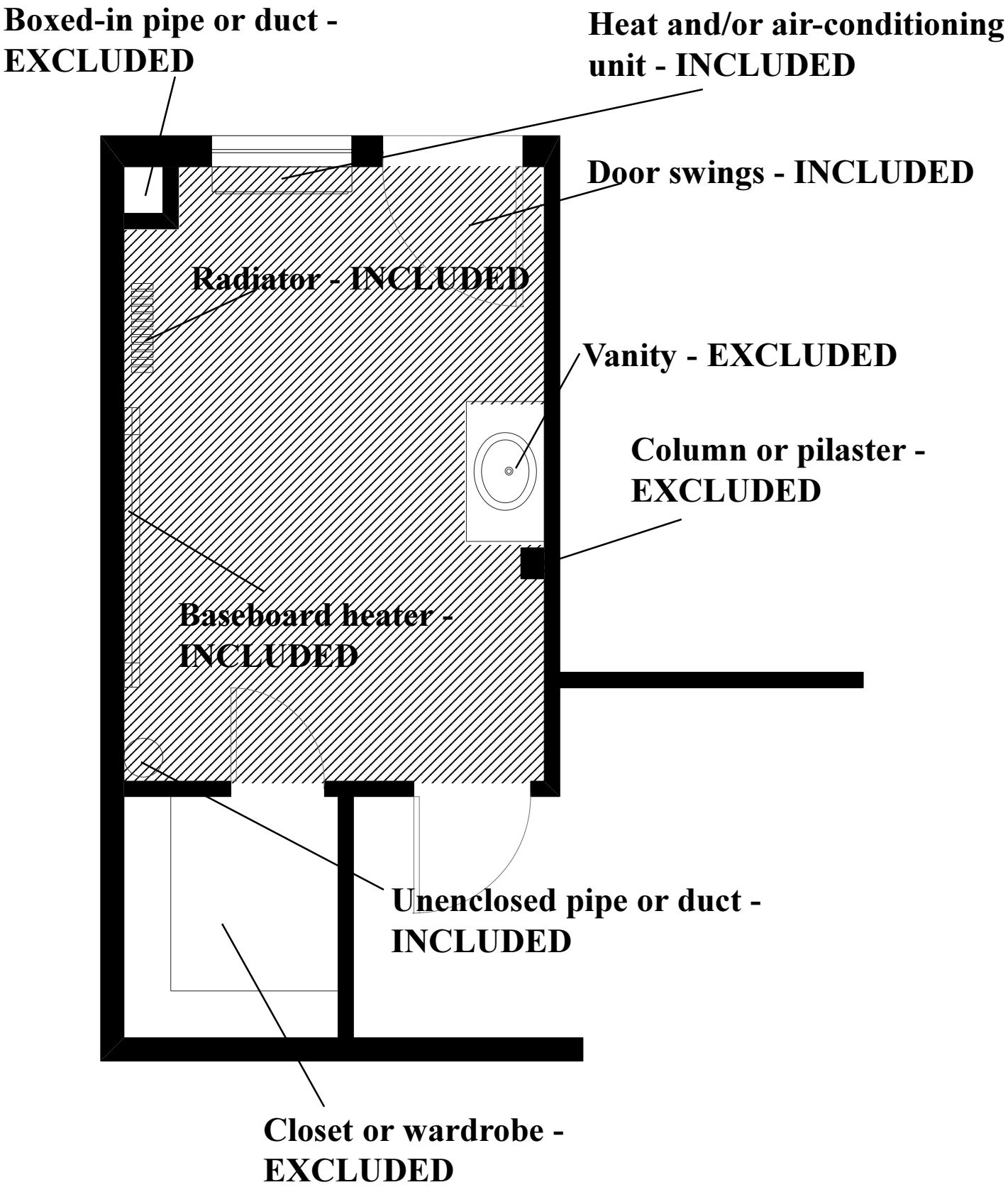


Figure 1. Measuring Net Living Area

4. Gross Module Area

Gross module area is defined as the area within the walls comprising the perimeter of a module. The wall thicknesses within the perimeter walls are included. Vertical shafts and chases are excluded. Gross module area is measured from the centerline of perimeter walls shared with interior corridors, vertical chases, or other rooms. It is measured to the outside face of exterior walls. Corner rooms with two exterior walls must have the same interior dimensions as other rooms even though, technically, the gross module area for these corner rooms is slightly more than for other rooms. The gross module area shall not exceed 47 m^2 (506 SF), except for the slight adjustment for corner rooms cited previously. Also, some deviation is allowable for major renovation projects; however, a waiver from HQ USAF/CEH is required. See Figure 11.

5. Gross Building Area

Gross building area is measured to the outside face of the exterior enclosure walls. Do not include normal roof overhangs in gross building area. Normal roof overhangs are generally less than three feet wide and are unsupported by columns. Exterior covered areas such as balconies count as half scope and are measured from the face of the enclosure wall to the edge of the covered area. Stairs and elevator shafts count as half scope per floor that they serve. Refer to AFH 32-1084 for more information on scope calculation. The gross building area for Enlisted Dormitories must not exceed 66 m^2 (710 SF) per module. This limitation can be increased by 4m^2 (43 SF) for high-rise dormitories (4 stories or more) or for dormitories with site specific programming requirements, such as mobility gear storage areas, cold weather vestibules, etc.

Dormitory MILCON projects must comply with the design and construction guidance establishing the absolute size for the net living/sleeping area and maximum sizes for the 1+1 module and the gross building area. Commands desiring a waiver from these absolute planning factors must submit a fully justified request, formatted as a normal Congressional reprogramming action, including an economic analysis to:

HQ USAF/ILEH
1260 Air Force Pentagon
Washington DC 20330-1260

Table 2 lists the required and optional spaces, respectively, associated with Enlisted Dormitories.

There are no maximum allowable areas for the optional spaces provided the maximum gross area for the building/complex of 66 m^2 (710 SF) per module is not exceeded. It is difficult to accommodate all of the listed optional spaces at their recommended sizes in many dormitories. Programmers, therefore, must prioritize these optional spaces and their sizes based on individual project needs.

Required Spaces

Functional Space	Minimum Net Area	Maximum Net Area	Recommended Net Area
Living/bedroom area, 2 per module	11 m2 (118 SF)	11 m2 (118 SF)	11m2 (118 SF) (See Figures 2 thru 10)
One bathroom per module (Bath compartment containing 1 commode, 1 tub or shower.	2.3 m2 (25 SF)	None	Approximately 2.3 m2 (25 SF) (See Figures 2 thru 10)
Private lavatory vanity - 2 per module, minimum 900 mm (36 inches) wide, separate from shared bath and within or immediately adjacent to living/bedroom area	None	None	Approximately 1.87 m2 (20.1 SF) per lavatory vanity(See Figures 2 thru 10)
1 closet space for each living/bedroom area. May be walk-in closets or built-in wardrobe(s)	1.86 m2 (20 SF)	None	1.86 m2 (20 SF)
Kitchenette - 1 per module. Includes minimum 0.3 m3 (11 cubic foot) frost-free refrigerator/freezer, double-bowl sink, 2-burner cooktop with oven (self-cleaning recommended), microwave shelf with electrical outlet, range hood with exhaust fan, and eating space adequate for table and two chairs or breakfast bar and two stools.	None	None	Approximately 9.5 m2 (102 SF)
Laundry Facilities (1 appliance set [washer and dryer] per 12 persons. The ratio of dryers may be increased as appropriate)	None	None	2.3 m2 (25 SF) per appliance.
Bulk storage	None	None	2 m2 (22 SF) per storage cubicle. 1 storage cubicle per .667 residents
Utility Space	None	None	Requirements dependent on local conditions
Mail service area(s) 1 box per area. May be covered exterior space if climate allows	None	None	Requirements dependent on local conditions
Circulation Space	None	None	7.4 m2 (80 SF) per module, varies with layout

Table 2A. Enlisted Dormitory Spaces and Sizes

Optional Spaces

Functional Space	Minimum Net Area	Recommended Net Area
Multi-purpose space (May be programmed as meeting/study rooms, television rooms, workout rooms, etc.)	13.9 m2 (150 SF) for each multi-purpose area	0.19 m2 (2 SF) per module for each multi-purpose area
Game Room	28 m2 (300 SF)	0.19 m2 (2 SF) per module
Vending Area	9.3 m2 (100 SF) each	9.3 m2 (100 SF) per floor
Guest Toilets	9.3 m2 (100 SF) per dormitory	9.3 m2 (100 SF) per dormitory
Supply Storage Room	9.3 m2 (100 SF) per dormitory	23.2 m2 (250 SF)
Administration Area	12.4 m2 (134 SF) per dormitory	12.4 m2 (134 SF) per dormitory

Table 2B. Enlisted Dormitory Spaces and Sizes

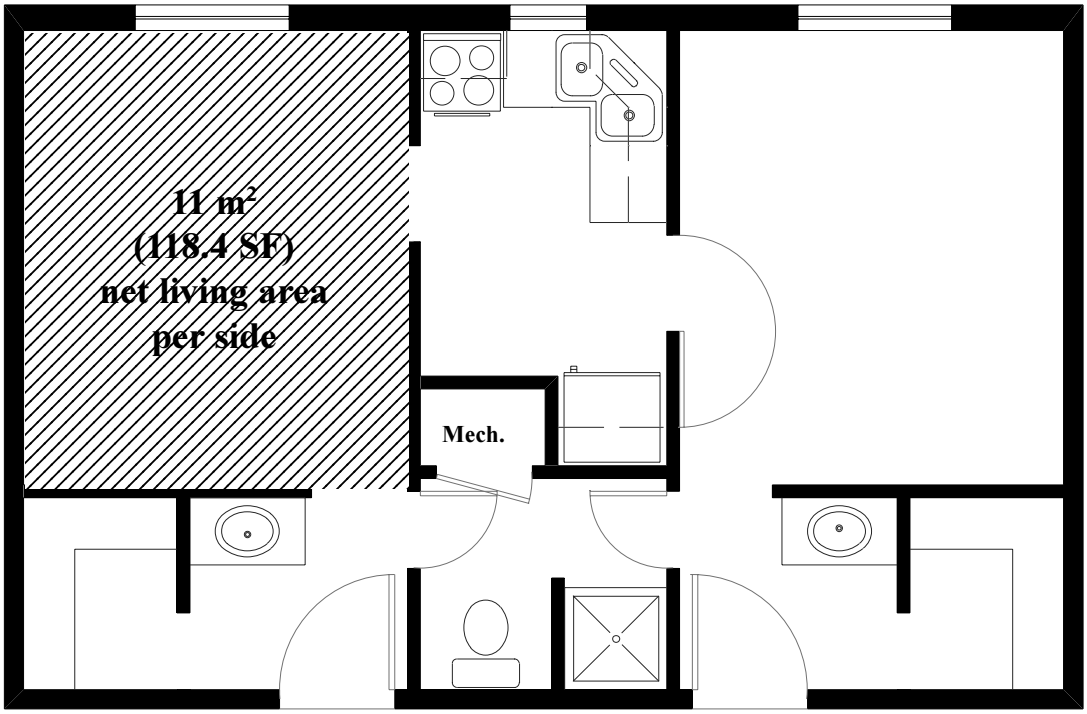
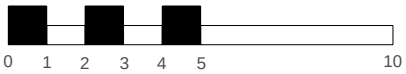


Figure 2. Typical Module, Type A Dormitory



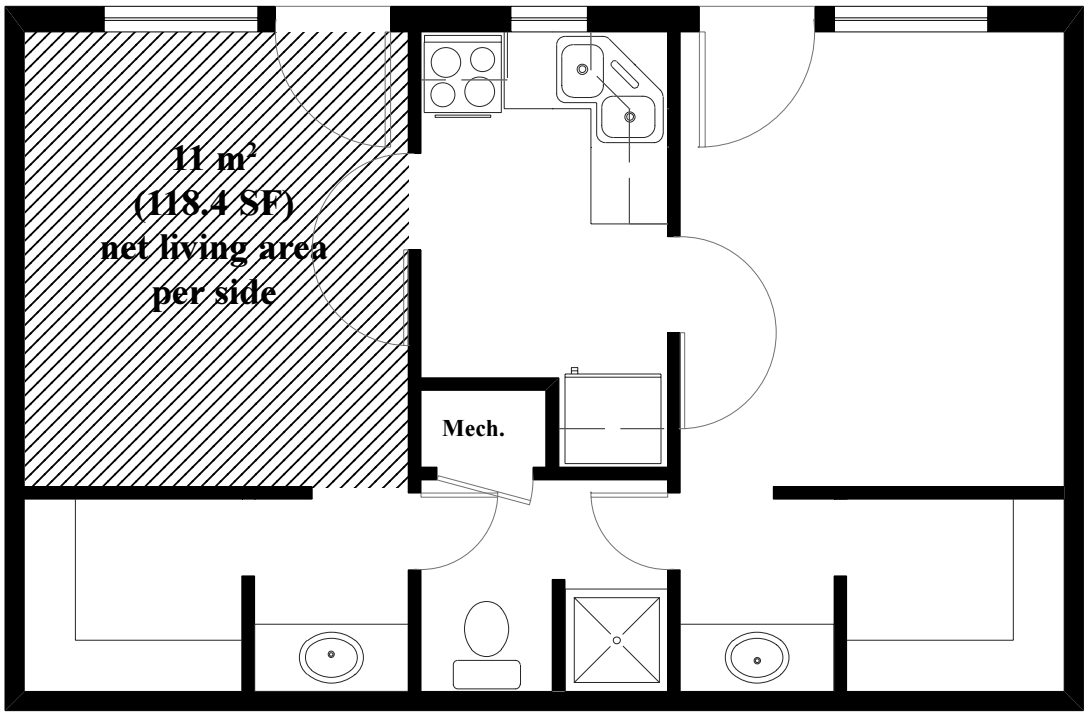


Figure 3. Typical Module, Type B Dormitory

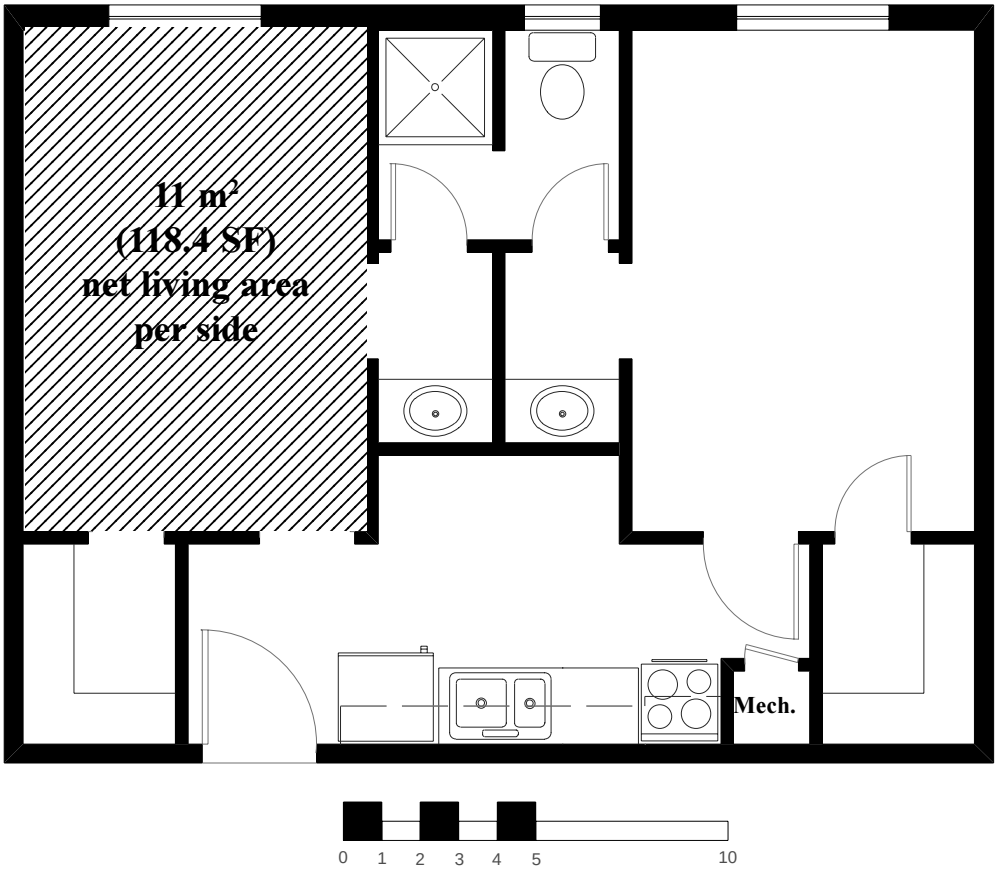


Figure 4. Typical Module, Type A Dormitory

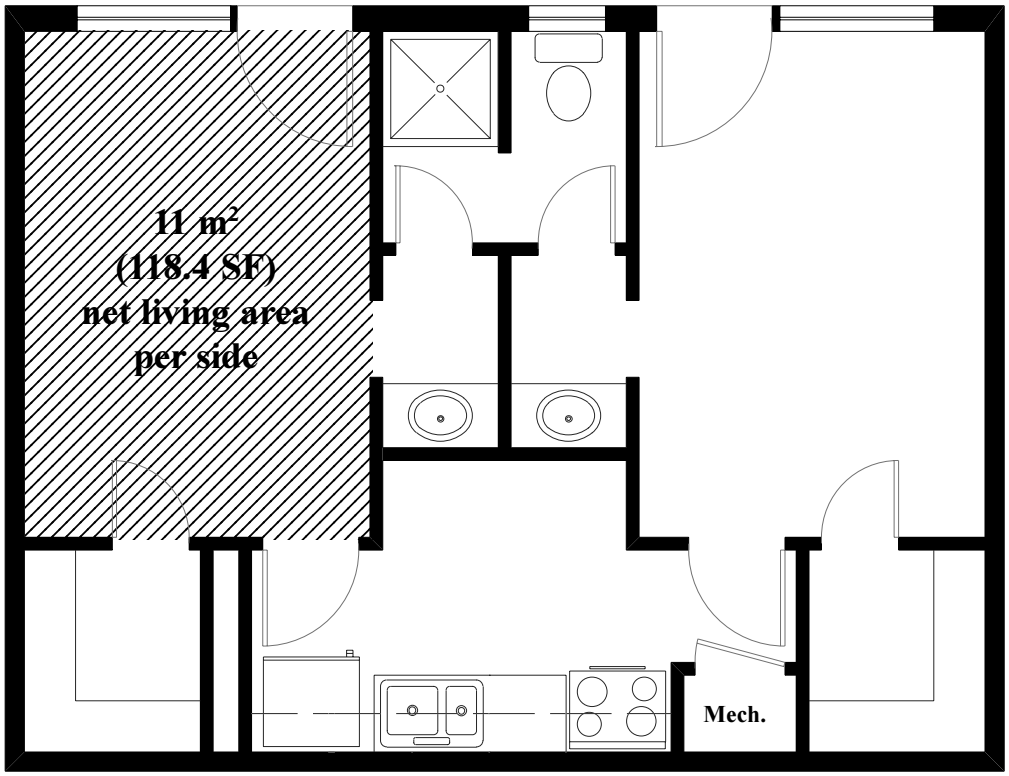


Figure 5. Typical Module, Type B Dormitory

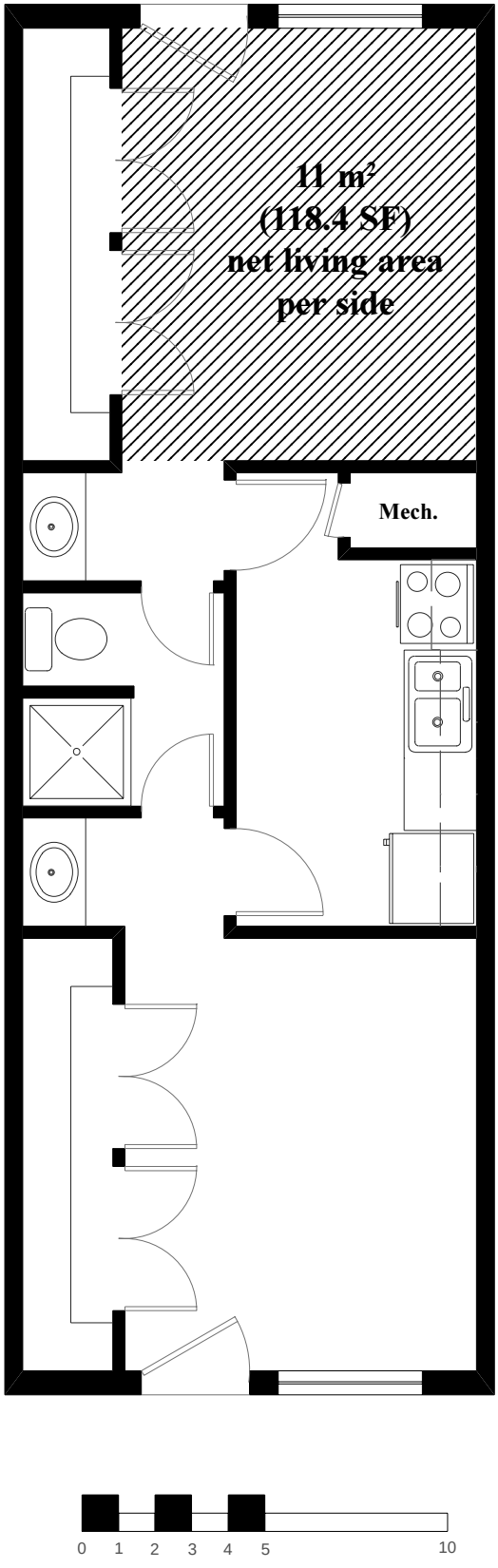


Figure 6. Typical Module, Type B Dormitory

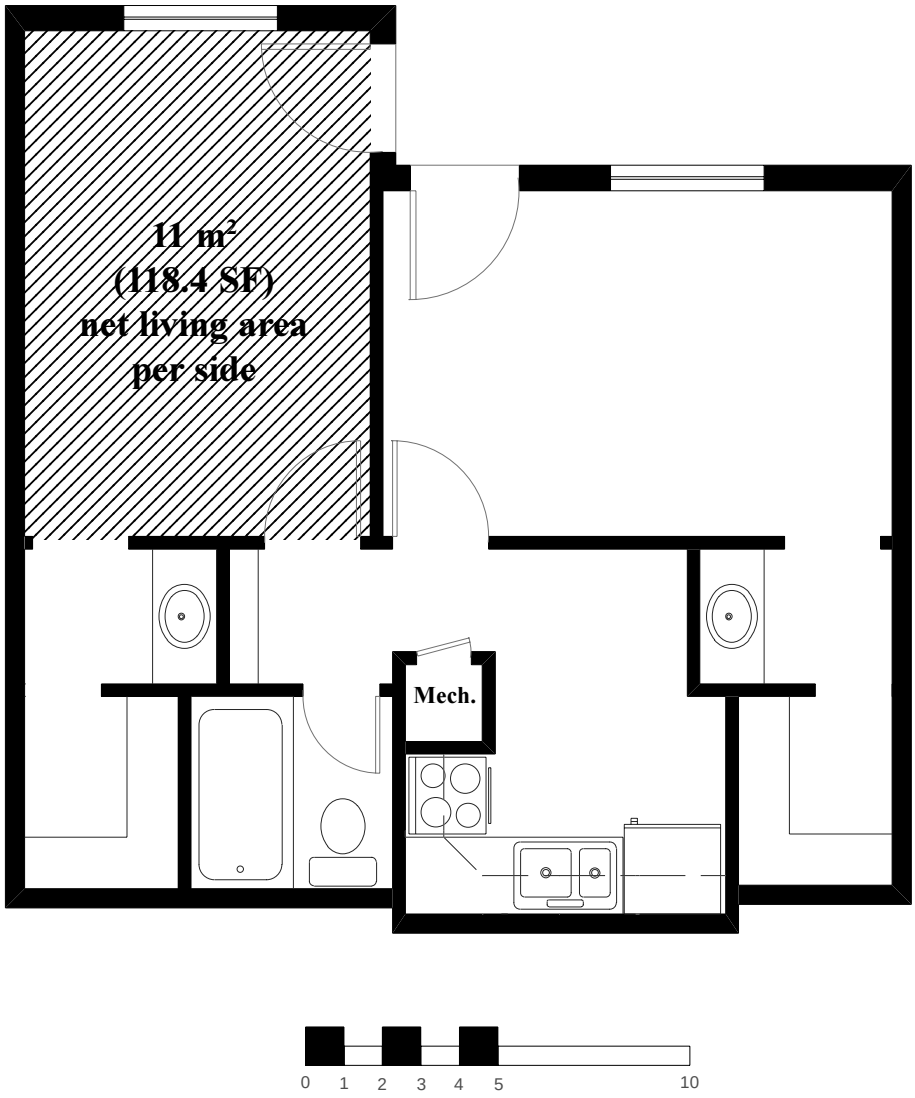


Figure 7. Typical Module, Type C Dormitory

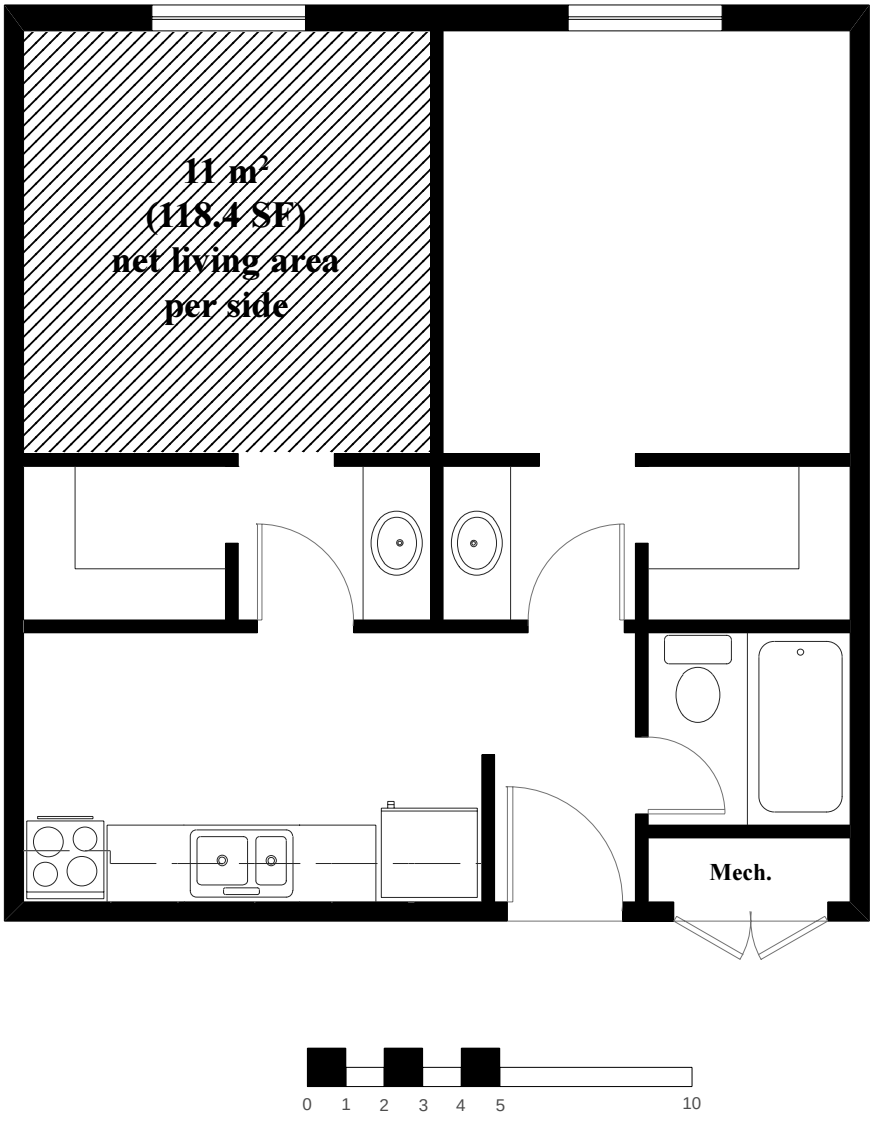


Figure 8. Typical Module, Type A Dormitory

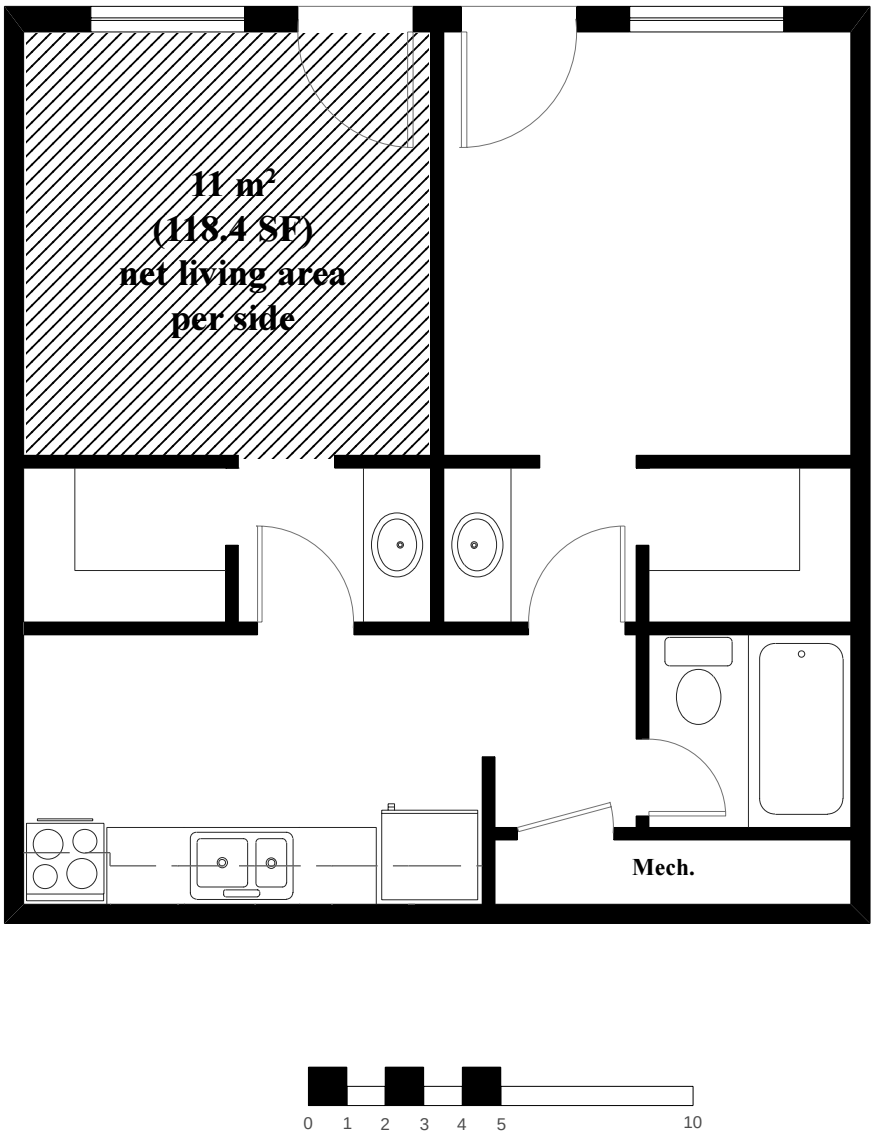


Figure 9. Typical Module, Type B Dormitory

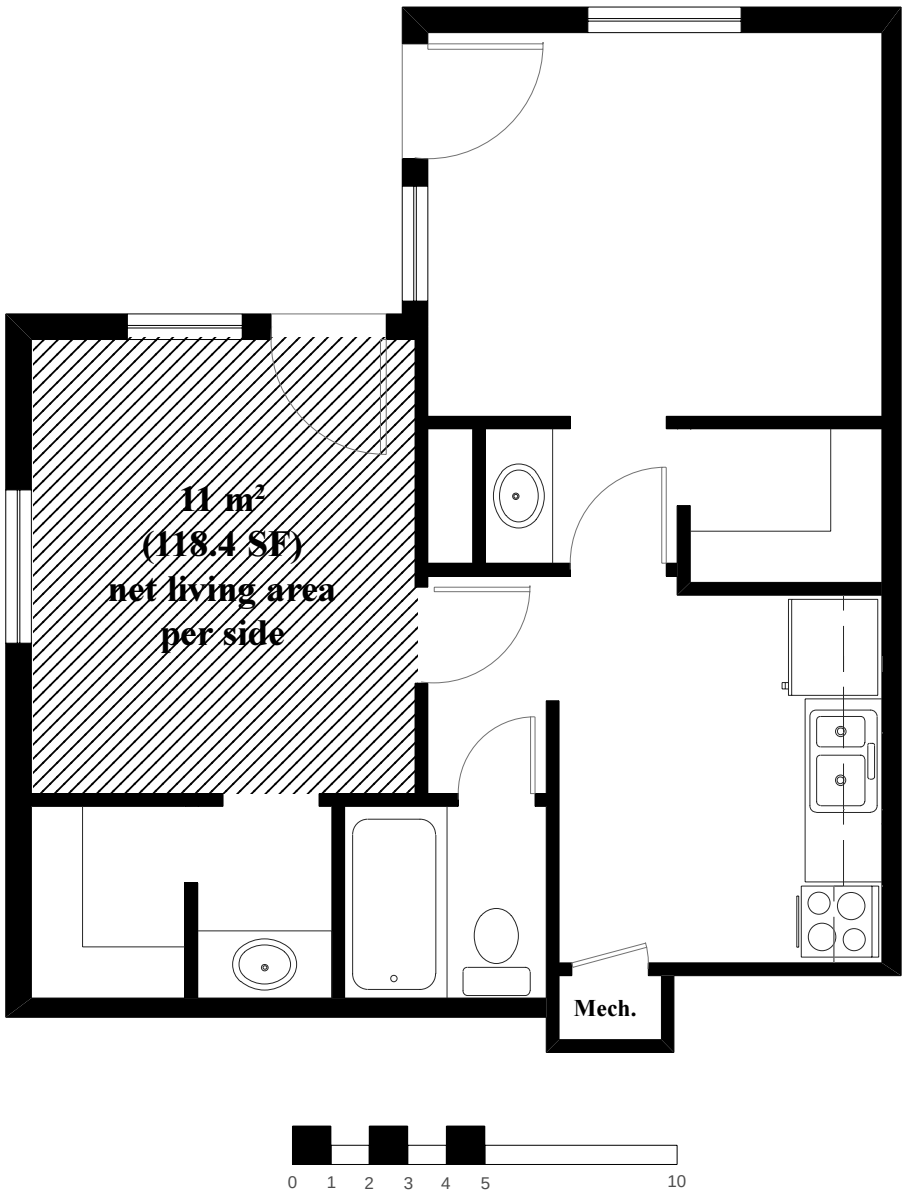


Figure 10. Typical Module, Type C Dormitory

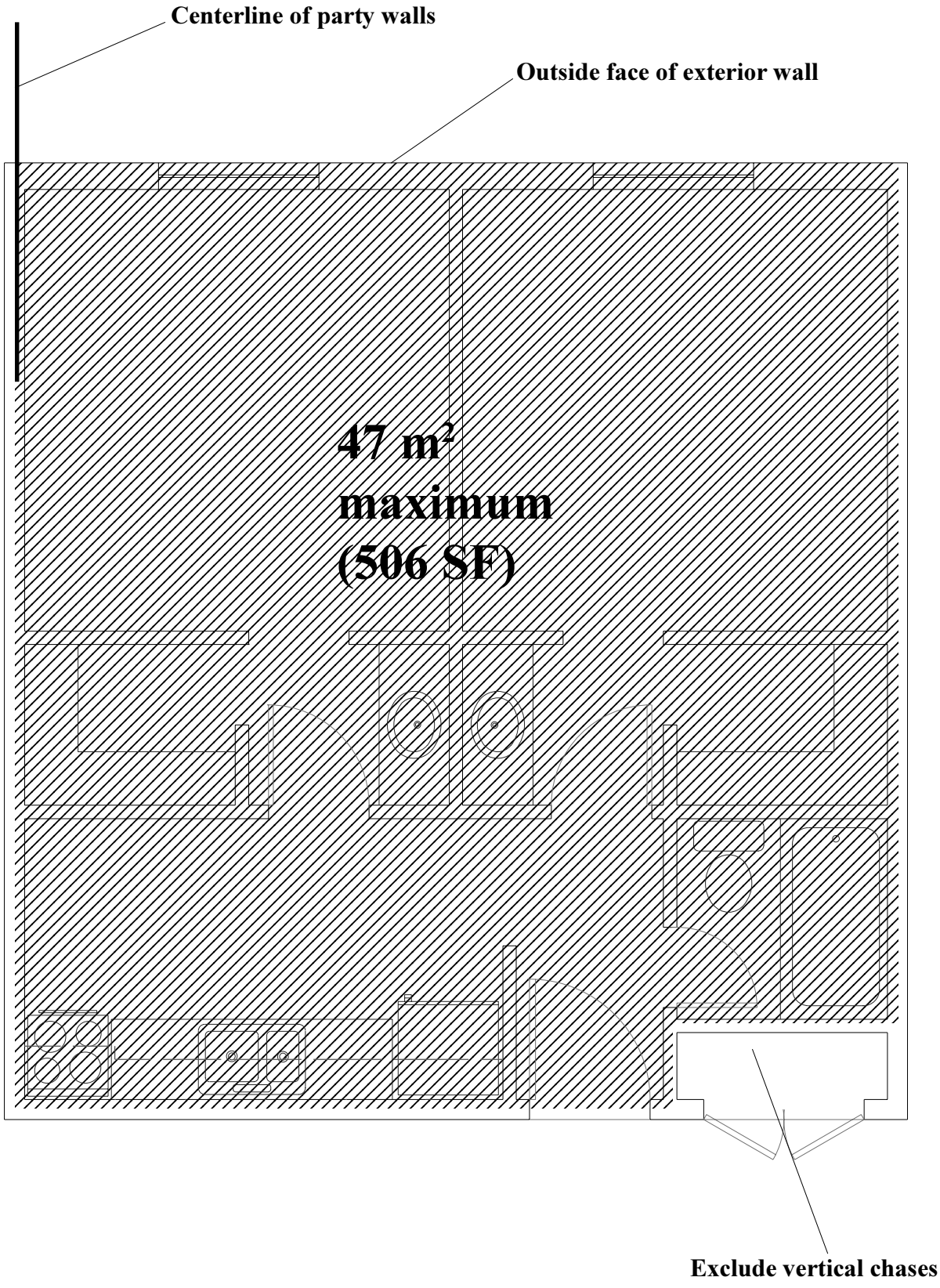


Figure 11. Shaded Area Indicates Gross Module Area

6. Example

The following example shows how the areas defined by Table 2 are used to program a typical Enlisted Dormitory.

Assume, a 3-story dormitory will house 200 persons and assume all are grade E-1 thru E4.

A. E1-E4s are housed 2 persons per module therefore, 100 modules are required (200 persons divided by 2 = 100). Figure adjusted to 102 to allow for an even distribution of modules per floor.

B. Total number of modules per floor is 34 (102 modules divided by 3 stories). It is usually important for the number of modules per floor to be an even number, as this allows equal distribution of modules on each side of a central corridor (Type A dormitory) or arranged evenly back-to-back or side-by side (Type B dormitory). This is not mandatory, however, and the space normally reserved for a module can be used for other purposes.

C. The maximum allowable gross building area for this building is 6,732 m^2 or 72,463 SF (102 modules x 66 m^2 allowable gross area per module).

D. The gross building area occupied by the modules is 4,794 m^2 or 51,602 SF (102 modules x 47 m^2 maximum gross area per module).

E. The recommended net area devoted to Multipurpose Space is 19.4 m^2 each or 209 SF (102 modules x 0.19 m^2 per module). A meeting room, television room, and a workout room are desired; therefore, 58.2 m^2 or 626 SF is required. (19.4 m^2 per module x 3 modules)

F. The recommended net area devoted to the Game Room is 28 m^2 or 300 SF (102 modules x 0.19 m^2 per module or a minimum 28 m^2).

G. The recommended net area devoted to Laundry Facilities is 78.2 m^2 or 842 SF (1 appliance per 3 modules, 102 divided by 3 = 34 appliances. 34 x 2.3 m^2 per appliance = 78.2 m^2).

H. The recommended net area devoted to Vending is 27.9 m^2 or 300 SF (one 9.3 m^2 space per floor x 3 floors = 27.9 m^2).

J. The net area devoted to Bulk Storage is 272 m^2 or 2,928 SF (204 residents x .667 = 136 storage cubicles at 2 m^2 each = 272 m^2. 2 m^2 includes circulation).

K. The recommended net area devoted to Guest Toilets is 9.3 m^2 (100 SF).

L. The recommended net area devoted to Administration area is 12.4 m^2 (134 SF).

M. The recommended net area devoted to Circulation is 754.8 m^2 or 8,125 SF (102 modules x 7.4 m^2 per module).

N. The total area included in paragraphs D through M is 6,035 m^2 (64,957 SF).

O. The remaining area available for Mail Service, Utility Space, half-scope exterior covered areas, wall thicknesses, etc., is 697 m^2 or 7,502 SF (6,732 m^2 allowable gross building area minus the 6,035 m^2 from paragraph N).

The area of 697 m^2/7502 SF available for utility space, mail service, etc., may be insufficient and may require reducing or eliminating optional space.

Note: The spaces identified in paragraphs E through L are often grouped together, either in a common area or a separate building or nodule. In this example, the total net area for these spaces is 447.2 m^2 (4,813 SF).

Functional Space	Area in Square Meters	Area in Square Feet
102 modules (102 modules x 47 square meters)	4,794	51,602
Multi-purpose Space (102 modules x 0.19 square meters x 3)	58.2	626
Game Room (minimum 28 m2)	28	300
Laundry Room(s) (1 appliance/ 3 modules = 34 appliances x 2.3 m2)	78.2	842
Vending area (9.3 m2 x 3 floors)	27.9	300
Bulk Storage (136 storage cubicles x 2 m2)	272	2,928
Guest Toilets	9.3	100
Administration	12.4	135
Circulation (102 modules x 7.4 m2)	754.8	8,125
Subtotal	**6,035**	**64,958**
Maximum allowable building area (102 modules x 66 m2)	6,732	72,463
Difference available for Utility space, Mail service, etc.	697	7,505

Note: figures in table above vary slightly due to rounding and metric conversion.

Note: figures in table above vary slightly due to rounding and metric conversion.

Table 3. Summary of Example

D. Site Selection Process

1. Team Composition

The site selection process involves forming an interdisciplinary team to evaluate various alternatives. The team should consist of: a community planner, architect, installation or wing senior enlisted advisor, site development professionals (landscape architect and/or civil engineer), an operations and maintenance representative, and representatives from the using organization.

2. Evaluation Criteria

Use the Comprehensive Plan to evaluate potential sites for the proposed development. Each site has differing inherent values differing values caused by the site's relationship to other sites. The site evaluation team must develop a system of ranking and rating the development potential of each site. The ranking/rating system developed must provide a fair evaluation of all factors influencing the enlisted dormitory project. The program needs for the project must be the key in developing the ranking system.

Ranking

A system of weighting each factor will help differentiate the importance of each factor. Use a weighting scale of one to five, with five being the most important and highest value. Each factor has a weight assigned agreed upon by the site selection team.

Rating

Rate each using a scale of one to ten with ten being the highest and most important value. The following is a suggested list of factors:

- Development Potential
- Proximity to Existing Recreation Facilities
- Relationship to Community Facilities
- Existing Topography
- Existing Landscape
- Available Base Infrastructure
- Adjoining Land Uses
- Vehicle Circulation System
- Future Expansion
- Existing Enlisted Dormitories
- Existing Walkways, Designated Bike and Jogging Paths
- Other Factors as Might Be Determined by the Design Program

An easy means of organizing the ranking and rating of each factor is to organize the data into a matrix format. Each team member must evaluate each site utilizing the factors identified above and must record the information on a tabulation sheet. The numerical value assigned by each rater is multiplied by the factor weighting value and the tabulation sheets are summarized and totaled to obtain the evaluation results. The decision matrix is a summary document that displays the results of the evaluation data and forms the basis for a decision regarding specific site selection. This is a good summary document for the community planner to present to the Facilities Board with the recommendation for siting approval.

E. Special Project Costs

1. Cost Factors

Consider the following special factors when establishing initial estimates of project costs in addition to usual cost estimating considerations:

- Expenses associated with special design features in a dormitory room can account for a large portion of the total project cost because the features are repeated in every module. Programmers and designers must be aware of current unit cost factors. Programmers will only use unit costs; therefore, designers must be concerned about the cost impact of special design features. A good example is kitchen equipment, where the cost can vary greatly, depending upon the quality of each item.

- Utility requirements for dormitories often exceed those of other facilities of similar size because of the higher energy demands and occupancy densities. Programmers must determine these requirements and include them in the construction budget if they are associated with the cost of supporting facilities. Otherwise, accomplish the program requirements within the unit cost. The cost of pipe tunnels and trench systems associated with dormitories can have a significant impact on construction costs.

- The type of mechanical system selected for a dormitory has major impact on the cost of the project. An existing steam and chilled water distribution system from a central energy plant may have the capacity to supply the new dormitory. In other cases, the new dormitory complex may justify its own central energy plant, or it may be more cost effective to provide each dormitory with a separate mechanical system. Make these decisions as early in the programming or design process as possible. Life cycle cost analysis is especially important for mechanical systems in dormitories due to unique use requirements.

- Preliminary soils analysis is essential to determine whether extensive site work and foundation costs are required. Local environmental and climatic conditions can also impact costs. Dormitories located in areas prone to seismic activity generally cost more. Climatic influences such as heavy snow loads, wind loads, and extreme temperatures result in additional costs due to structural and insulation requirements.

The dimensional proportions of modules are critical to the overall construction cost of a dormitory. Designers must consider not only efficiency in design of the individual modules, they must also focus on how the modules string together to create a building. Figure 12 illustrates the effects of module proportion.

- Examples 1, 3 and 5 have almost identical widths (dimension 'A') and are essentially the same length, considering Example 5 is a Type A dormitory with a central corridor. Based on module proportions alone, the comparable construction costs between these three examples would be negligible.

- Example 2 has the largest 'A' dimension. It also has the smallest 'B' dimension, but results in the longest building of all the examples. Longer buildings require a larger site and have more exterior wall surface area.

- Example 4 has one of the smallest 'A' dimensions, and the 'B' dimension is almost identical to Examples 1 and 3.

- Example 5 is a Type C "garden apartment type dormitory. The landing area is smaller than a central corridor or a balcony, but a stair tower is required to access fewer units.

- Example 6 has the smallest 'A' dimension and the largest 'B' dimension, resulting in the shortest building of all the examples.

- The modules used for the examples have large differences in the amount of interior wall surface and the number of doors.

These examples show that there are many factors that affect construction costs. While module proportions, interior wall quantity, and the number of doors can be optimized to produce the lowest cost, designers must also consider the impact these factors may have on privacy, functionality, and aesthetics.

A hypothetical cost analysis was performed for Examples 1, 4, and 6. The analysis assumed that the same program criteria was used to develop complete dormitories from the three examples. The total facility cost and the cost per module varied only slightly (less than 3% difference between the highest and lowest.)

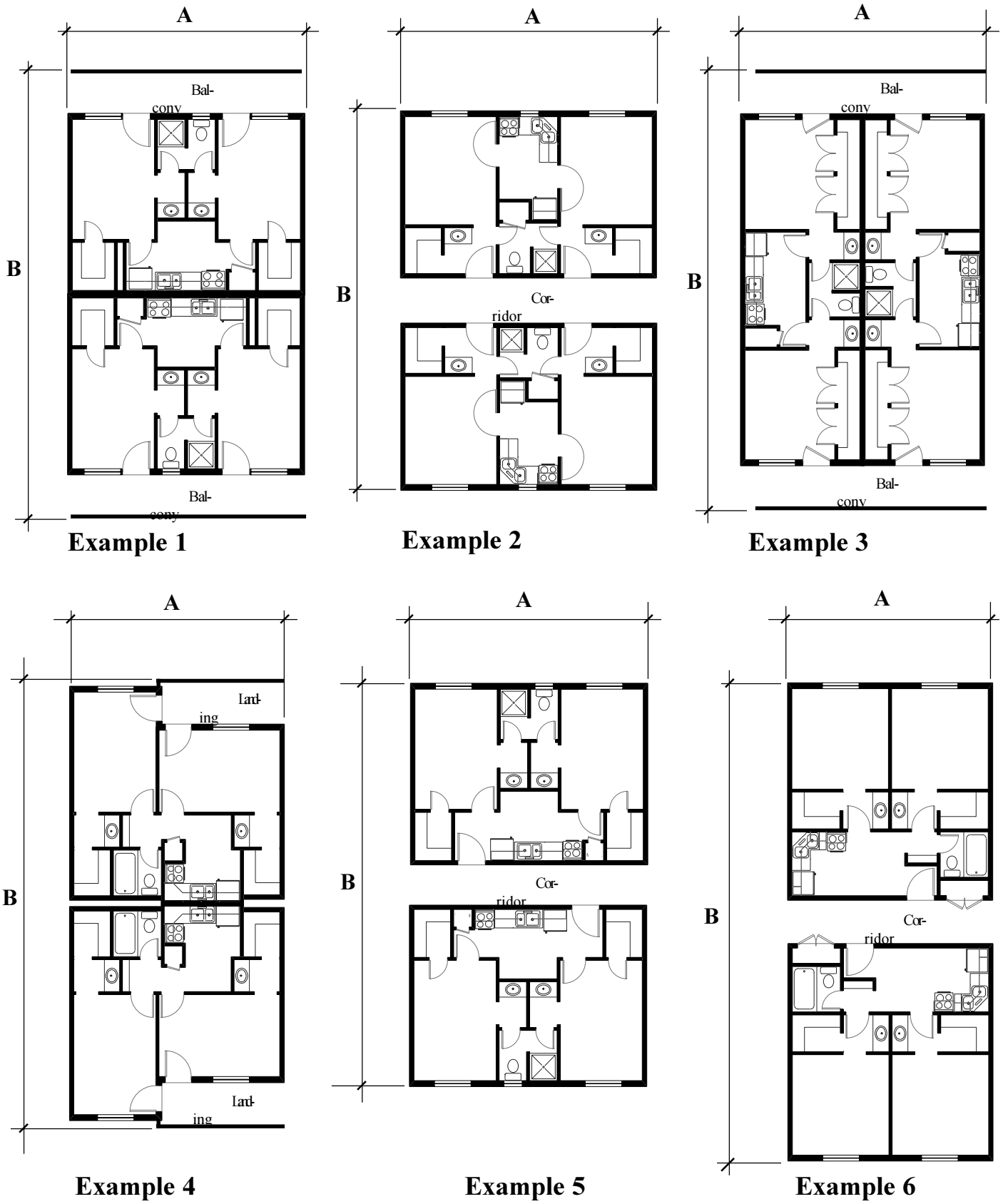


Figure 12. Module Proportions

Chapter 3 - Overall Project Design

A. Site Planning

Site planning is one of the more important elements of any project design and can "make or break" the overall success of the enlisted dormitory project. The art of site planning requires an interdisciplinary involvement of the community planner, landscape architect, architect, interior designer, and civil, mechanical and electrical engineers. Leave one of these design disciplines out of the site planning process and the quality of the design will suffer. The landscape architect should lead and be responsible for the development of the site plan, coordinating with the other disciplines.

1. Siting Requirements

To achieve the optimum site plan, each design discipline must work in concert with one another. The following siting requirements must be evaluated and analyzed to ensure the optimal solution is selected:

Location

New enlisted dormitories should be sited in accordance with the installation's Comprehensive Plan and should be located within walking distance of the airmen's dining hall, wherever applicable.

Site Organization

Pay special attention to building orientation, mass and scale in developing the site plan. Develop a sense of order, arrival, orientation and community in planning the site. Insofar as possible, dormitory structures must not be overwhelming in apparent size. Site dormitories in relationship to one another to create outdoor spaces for use as passive or active recreation areas.

Most Air Force enlisted dormitories are three stories in height. This configuration maximizes the efficient use of available real estate while avoiding the additional fire protection, inconvenience to occupants, and structural and life safety cost associated with buildings over four stories in height.

Achieve spatial balance and scale through thoughtful placement and arrangement of structures, landscaping and landforms. See Figure 13 for an illustration utilizing professional site development concepts for a typical Enlisted Dormitory project.

Expansion potential for dormitories usually involves the addition of more living units. It is generally impractical to build an addition onto an existing dormitory building. If the potential for adding additional living units to a dormitory project is identified during the initial programming stage, allow space in the site development plan for additional structures and size site utilities accordingly.

Orientation

Site dormitories to take advantage of the positive features of the site. Provide protection from undesirable winds and glare, shading from excessive sun in warm climates, and orient operable windows to take advantage of summer breezes. Solar gain and prevailing winds can enhance energy conservation and affect a significant cost savings. Building placement and design should also take advantage of views that are scenic, pleasant, or interesting. Designers must be sensitive to the approaches to the facility and strive to create a clear sense of arrival for newcomers.

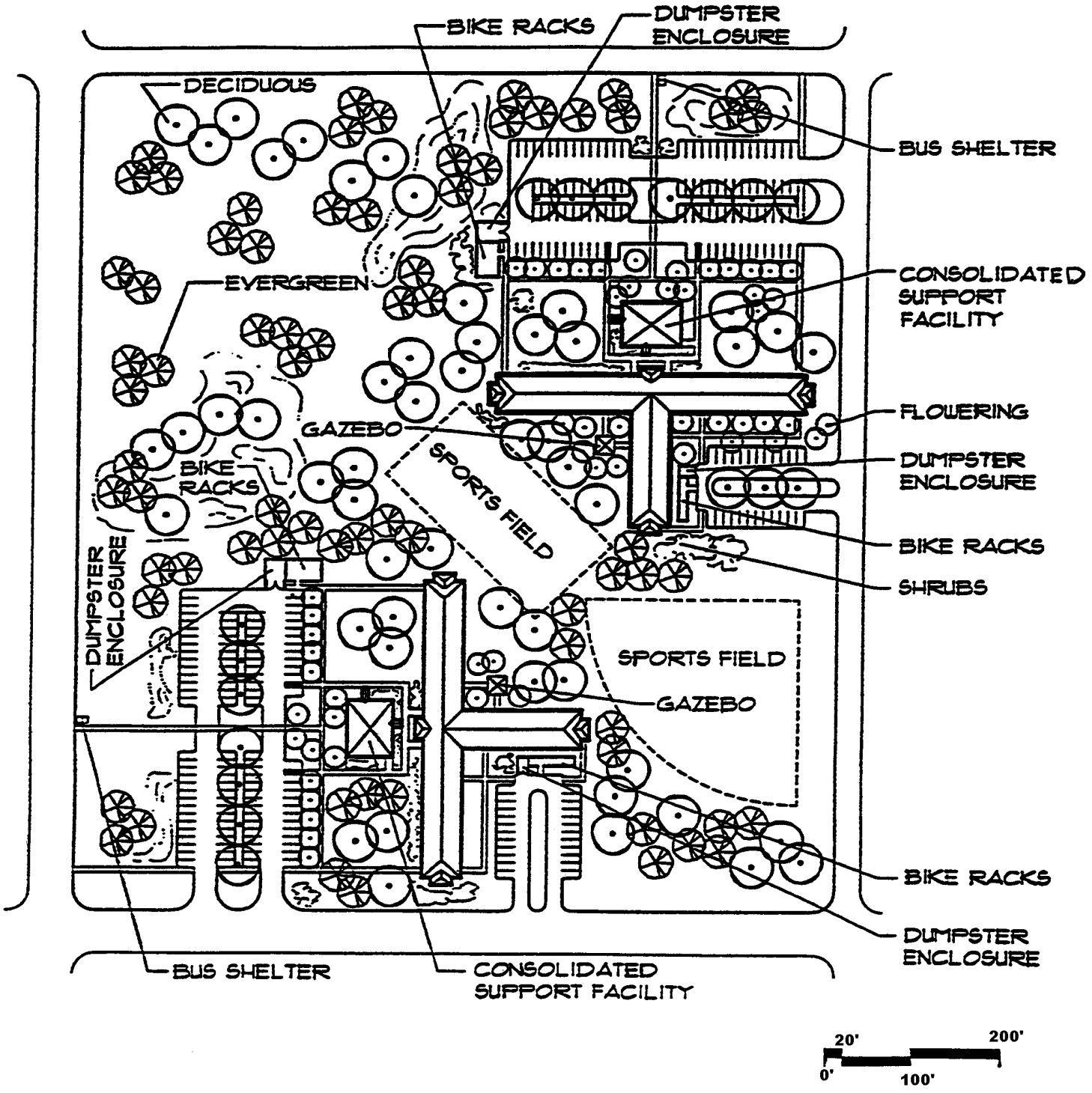


Figure 13. Typical Enlisted Dormitory Site Development

Design roof overhangs to work with sun angles to provide solar shading. This configuration is a built-in by-product of Type B dormitories that have exterior balconies. Achieve mutual shading by sensitively arranging adjacent structures. Avoid excess east or west facing glass and design for maximum cross-ventilation where feasible.

View of the Site

All design disciplines involved in the site planning process must evaluate and re-evaluate their design concepts to ensure the dormitory project presents a professional image of the Air Force, and encourage "pride of ownership". As a minimum, consider the initial view presented to visitors and the more personal view or impressions of the user.

2. Circulation

Vehicular Access

Provide access to the dormitory from secondary (collector) streets to reduce congestion associated with main arterial streets. Where possible, divide main entrances with landscaped traffic medians between entry and exit lanes. Because of the high volume of traffic using the entrances, the width of non-divided entrances must be a minimum of 7.32 m (24 feet).

Fire Protection

Site all dormitories a minimum of 40 feet laterally from the closest adjacent building. Provide access to fire protection vehicles from three sides. Obtain width, weight, and turning radii of fire fighting vehicles from the base fire department.

Service Vehicles

Design access streets and parking areas to accommodate service vehicles and fire protection equipment. Where interior court areas are proposed between adjoining dormitories, consider designing the main pedestrian walks to accommodate service and fire protection vehicles. As an example, the minimum width of such walkways must be a minimum of 8' wide and must be constructed using reinforced concrete to accommodate medium weight vehicles. Consider treating the walkways with a patterned concrete system to minimize the negative impact of the wider access route. Use materials such as concrete grassroad type pavers to provide access to infrequent service vehicles.

Bus Route Access

Designers should consider developing shelters and walks to serve enlisted personnel needs if the base provides bus service. Bus shelters must be compatible with the architectural style of existing buildings and other bus shelters on base. Where existing shelter design needs upgrading, the site planner must coordinate with the base in selecting a new style that is programmed with all new projects. Coordinate the quantity and location of bus shelters with the base transportation manager.

Pedestrian Circulation Systems

Walkways to building entrances must be 8' wide. All other sidewalks are 6' wide. Design and grade sidewalks to provide barrier free access to the first floor of all dormitories and to any outdoor use areas associated with the dormitories. Provide corridor connections to other functional areas of the base with pedestrian circulation systems. Consider developing jogging/biking trails as part of the site development.

Passive Outdoor Areas

Plan all dormitory facility developments to provide outdoor passive and/or active use areas. Where appropriate, design pavilions to become an integral part of the dormitory complex. The pavilions must compliment the architectural style and materials of the dormitories. Compliment these use areas with additional facilities such as bar-be-que grills, tables, benches, lighting and landscape plant materials.

Service Entrances

Where possible, separate service entrances associated with mechanical rooms or mechanical enclosures from parking areas.

3. Parking

Vehicle parking areas consume more site space and impact more on the physical environment than any other site feature. The guideline to provide one parking spaces per dormitory resident results in a significant area of paving which, if not planned properly, will have a negative impact. This parking ratio applies to most dormitories, but may be modified based on the parking needs of the specific project. Paving increases stormwater runoff, results in increased reflected and absorbed radiation, and raises the ambient air temperature of the surrounding area. Parking areas also result in reflected sun glare off vehicles, increased air pollution, and concentrated contamination of runoff from leaking oil and antifreeze.

Grading can create a transition zone within parking areas, between parking and dormitories, and between multiple groups of dormitory facilities. For instance, terraced parking areas can break up the expanse of parking and reduce the visual impact.

Many of the negative impacts of parking areas can be mitigated or lessened by improved design techniques. Tree planting in islands between rows of parking intercept reflected radiation, visually breaks up the mass of paved surface, and provides shade for vehicles. Properly located, the traffic islands also can provide safer pedestrian circulation. Where topography allows, design parking areas in multiple levels with transition zones. This may reduce grading requirements and allow the designer to balance the volume of cut and fill. Design these transitions as landscape buffers much like traffic islands to soften the visual impacts.

Parking for the Persons with Disabilities

The parking requirement for dormitory facilities assumes all occupants are able-bodied enlisted personnel and does not provide for visitors with disabilities or temporarily disabled enlisted personnel. Provide additional handicap parking spaces in accordance with the Uniform Federal Accessibility Standards and the Americans with Disabilities Act Architectural Guidelines. Locate these parking spaces to provide the most convenient access to the building entry.

Motorcycle Parking

Construct areas designated for motorcycle parking of reinforced concrete to prevent motorcycle stands from sinking into the asphaltic concrete parking areas.

Bicycle Parking

Bicycles are frequently used by residents. Provide lockable bicycle parking facilities within the dormitory complex area. Provide all bicycle parking on concrete surfaces adjacent to sidewalks or first floor building corridors. Parking areas must be covered and screened from view of the general public. Consider enclosed bicycle lockers, which maximize security and minimize visual clutter. Such lockers can be purchased with equipment funds.

4. Grading

Grade the site to achieve an orderly transition from the point where enlisted personnel enter the site by automobile or on foot to the point where they are at the first floor elevation. Site grading must consider the impacts of the parking area, the dormitory, bus-stop shelters, sidewalks, outdoor passive use areas, mechanical equipment and trash dumpsters. Where appropriate, use grading to control the negative impacts these man-made facilities have on the visual environment, such as shielding trash dumpsters, etc. See the discussion of landforms below.

Dormitories tend to be linear and relatively narrow in their configuration; therefore, lending themselves to an orientation paralleling existing contours. Determine if storm water retention is required by local building codes. Where on-site retention is required, the location of retention areas must be carefully thought out in terms of the function as well as their visual impact. Use large retention sites for outdoor recreation areas.

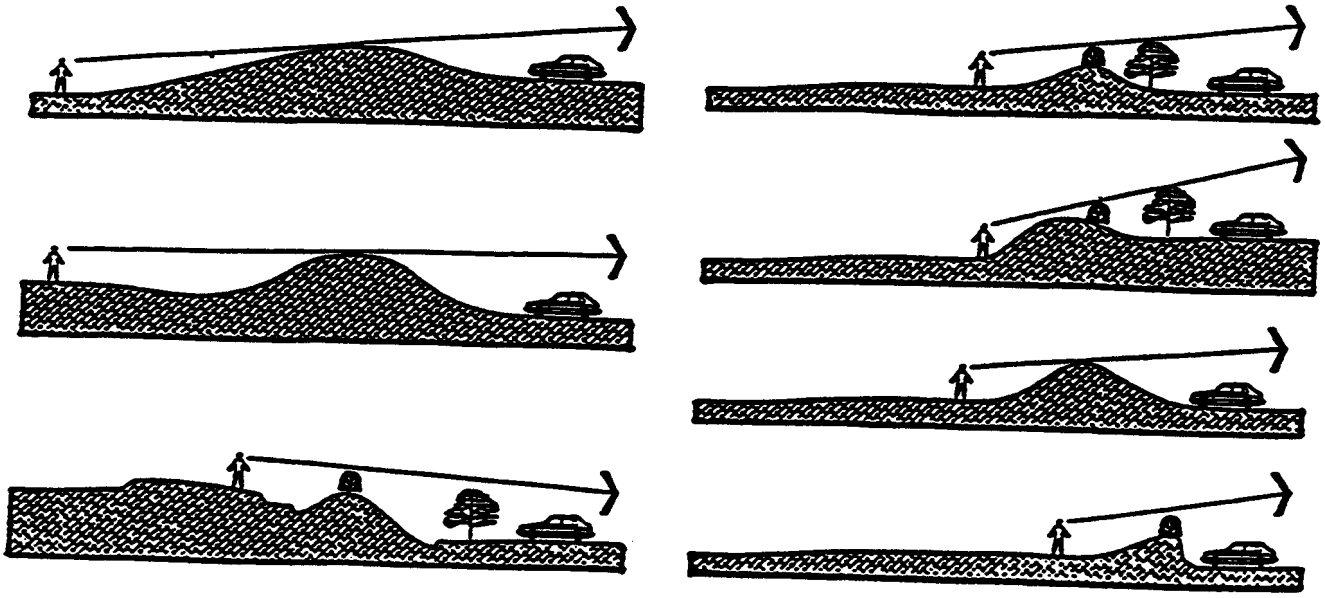


Figure 14. Landforms

Establishing the Finished Floor Elevation (FFE)

Establishing the finished floor elevation of enlisted dormitories is one of the more important aspects of site planning. The FFE affects grading, cut and fill, visual impact of the facility and interior-exterior transitions. In addition, the FFE has a significant impact on the landscape architect's ability to effectively introduce plant materials into the new environment. When the approach is to "level the site" without sensitivity to other demands, the results often are catastrophic, resulting in barren sites lacking visual interest. The landscape architect, architect and civil engineer must work closely together to achieve the most optimal design results.

Storm Drainage

The successes and failures of site planning rely heavily on the designer's ability to facilitate drainage. Depending on the geographic location and the availability of nearby subsurface storm drains, provide underground storm drainage for each enlisted dormitory complex. All site water must either be intercepted in drop inlet structures or be designed to drop directly into a subsurface system. If subsurface storm drains are not available at the proposed site, then program them as part of the dormitory project. As a minimum, divert surface water to an underground system to a point where it is discharged into above ground storm drains. Provide for retention and erosion prevention. Do not discharge water from downspouts onto splash blocks. Provide for drop inlets as necessary to intercept surface runoff and prevent walkways from being flooded.

Landforms

The landscape architect and the civil engineer must work together to use landforms to soften the impact of parking on the landscape. Use landforms such as mounds and swales in conjunction with landscape plant materials to soften or obscure the parking areas, provide spatial articulation, or enhance drainage structures or surface water retention areas. Use landforms to add interest and diversity to the project. In particular, landforms can perform an important function around outdoor activity areas by screening undesirable views. See Figure 14.

5. Utility Corridors

The site planner should develop underground utility corridors in coordination with the base community planner, electrical, mechanical, and civil engineers. Size corridors to accommodate future expansion. Locate utility corridors no closer than one and one-half times the crown width of mature trees or 10.7 m (35 feet), whichever is greater. Locate utility corridors to allow for future street tree plantings. Consider using pipe tunnels and trenches.

6. Site Amenities

Site Lighting

Site lighting is an integral part of any dormitory project. Provide lighting to ensure occupants have a means of safely moving between outdoor spaces. Consider base design standards, if available, in the selection of luminaries and poles. This selection must be a joint decision between the landscape architect and the electrical engineer. Energy-efficient, high-pressure sodium lamps with color correction ensure optimum visual acuity and are recommended for energy-conscious site lighting. Provide adequate site lighting at any point where there is a change in grade requiring steps, near handicapped and motorcycle parking areas, and near main entrances to buildings. A lighted sign may be appropriate for night visitors. Use the recommendations of the IES Lighting Handbook to establish illumination levels.

Site Furniture

The selection of site furniture and signage is similar to putting "icing on the cake". Along with the landscape development, it gives the project a finished appearance. Site furniture and signage that is in harmony with the architectural style of the dormitory facilities compliments the building, makes the outdoor spaces more usable, and appear more organized. Poorly selected and/or placed site furniture and signage can result in major disharmony, drawing attention away from otherwise superbly designed site and building features. The landscape architect must coordinate the selections with the architect and interior designer to ensure smooth transitions are made in the procession from within the building to the outdoors and vice versa. Effective transitions are achieved when building materials, colors, and design details from the building are incorporated into the paving materials, signage and site furnishings.

Trash Dumpsters

While trash dumpsters must have convenient access by the residents and by large trash handling trucks, they must be located in areas away from main entrances. Screen trash dumpster locations with any combination of hard wall materials, earth forms and landscaping to reduce their impact. Where hard wall materials are used, the materials must compliment the materials used in the dormitories and other outdoor facilities.

Mechanical Enclosures

Screen mechanical equipment such as chillers, evaporating condensers, switch gear, and electrical transformers. Architectural screening materials must compliment the architectural style and the materials used to construct the dormitory. Use landforms to screen objects in the landscape that do not require enclosures.

7. Landscape Design

Landscape plans developed for the Air Force require the services of a professional landscape architect working in conjunction with the other disciplines to achieve the total design intent for the project. In addition, the landscape architect must have an intimate knowledge of the plant materials for the region. Refer to the USAF Landscape Design Guide for further guidance.

The design intent should be creating an aesthetically pleasing landscape minimizing water usage, resources and maintenance requirements. Proper planning and design, plant selection, plant installation, and use of turf alternatives, use of mulch materials, zoning of plants as per water requirements, soil improvements, efficient irrigation and appropriate maintenance are the fundamentals of good landscape design.

Structure the landscape design program to satisfy the architectural, engineering, aesthetic, and environmental requirements of each project while minimizing maintenance needs. The following factors must be evaluated when performing a site analysis:

- Visual elements
- Climatic data
- Existing vegetation
- Soil quality
- Hydrology
- Topography
- Spatial and program analysis
- Circulation patterns
- Noise
- Security requirements
- Maintenance requirements

Analyze the following functional needs of each site:

Enframement

Identify appropriate views of the dormitory during the site analysis to emphasize with landscape design features. Focus attention to important features of the building by manipulating and placing tree masses and screening undesirable features.

Visual Enhancement

Plantings made for utilitarian purposes, such as screening service areas or shading, will simultaneously improve the attractiveness and enhance the livability of an area. Variety is introduced, vistas may be created and bareness relieved. The oppressive feeling of monumental scale is relieved by proper planting. Visually separate multiple buildings into several pleasant framed units, and enhance individual buildings within a group. The use of shrubs and small trees arranged in strategic groups around a building improves the appearance by softening structural lines. This also helps in integrating the building with its site and diverting attention from unattractive structural features.

Spatial Articulation

Use plant material to create enclosed spaces and to separate spaces one from another. Also use plant material to direct people through outdoor spaces by visually defining and reinforcing patterns of movement. The degree of enclosure, separation, or movement depends upon the density, form, and type of plant material used. Keep in mind deciduous plants vary with the season, and that most evergreens do not.

Visual Screening

Screen unattractive views or objects identified by the site analysis with appropriate plant material to obscure their negative impacts. Examples of screening needs include trash dumpster areas, pad mounted electrical transformers, parking areas, and mechanical yards. While plant materials can be used solely for screening purposes, a combination of plant and architectural materials offers an ideal solution to screening needs. Landforms coupled with plant materials will provide an immediate effect while waiting for the plant materials to mature.

Wind Control

Wind is either a pleasant or unpleasant climatic factor depending upon air temperatures, relative humidity, and air velocities. Use plants as wind control devices by breaking, guiding, deflecting or filtering the wind. Knowledge of the direction and speed of prevailing winds at different seasons of the year is necessary. When plants are used as a wind barrier, wind is generally affected for a distance of 2 to 5 times the height of the barrier to the windward side and 10 to 15 times the height of the barrier to the leeward side. Plants are better screens than fences or walls for windbreaks because they permit some degree of wind penetration. The most effective density is a screen of about 60%. Irregular forms provide a more effective windbreak than evenly spaced plants. A variety of plant species and sizes also provides a better windbreak than one consisting of one species. For climates where occasional to frequent snows occur, consideration must be given to how wind will drift snow

Interception of Direct and Reflected Radiation

The skillful use of plant materials around buildings, along walkways, and around parking areas significantly increases the energy efficiency of buildings and reduces the ambient air temperature around the dormitory project. By intercepting the direct and reflected radiation, plant materials control the absorption of heat energy by the building and parking areas, thus reducing energy costs.

Landscape Maintenance

Provide landscape establishment and maintenance within the initial contract for installation of plant materials. The duration of the establishment period must be for a period of one year in all cases and must not be included as a contract option. The establishment requirements must include:

- Irrigation
- Mowing and edging
- Replacing mulch
- Inspection/control of pests and weed control
- Tightening staking/guying materials
- Pruning
- Fertilization
- Maintaining watering saucers

Irrigation Development

Provide dormitory projects developed in arid and semi-arid climatic regions with irrigation systems. Use bubbler or drip irrigation systems adjacent to building facades to minimize impact of overspray. Provide all irrigation systems with solid-state automatic multi-station controllers, state-of-the-art control valves, and backflow preventers in accordance with building codes. In cold climates, locate backflow preventers in the mechanical room. Where freezing is not a problem, locate backflow preventers within screened mechanical enclosures. Include adjusting turf spray coverage, duration of watering cycles, repairing leaks, and general maintenance to ensure proper functioning during the maintenance period for all irrigation systems. Water conservation is a high-priority factor in development of the irrigation design. Take advantage of non-potable water if possible.

B. Building Design

1. Organization and Circulation

Enlisted dormitories consist of three basic functional areas:

- Residential
- Recreation
- Service

These three basic areas are linked together by circulation spaces. The basic areas typically are arranged in one of three configurations:

- The three basic functional areas are undistinguished within a major form.
- The areas are configured as connected components.
- The areas are contained in separate structures.

Give special attention separating noisy areas such as game rooms, television rooms, outdoor recreation areas, and laundry rooms from quieter spaces such as residential rooms and study rooms.

Design non-public support areas such as utility spaces, trash collection and mail service access to avoid conflict with public residential functions.

Privacy for residents is of utmost importance. Recognize that dormitories serve as homes for the residents, and design accordingly. Type B dormitories with direct exterior access for each resident provide a greater sense of privacy by minimizing corridor noise. However, Type B dormitories allow pedestrian traffic to occur directly outside living/bedroom area windows. Type C (garden apartment style) dormitories provide the greatest sense of privacy by limiting the number of modules accessed by a single stair, thus reducing noise and pedestrian traffic.

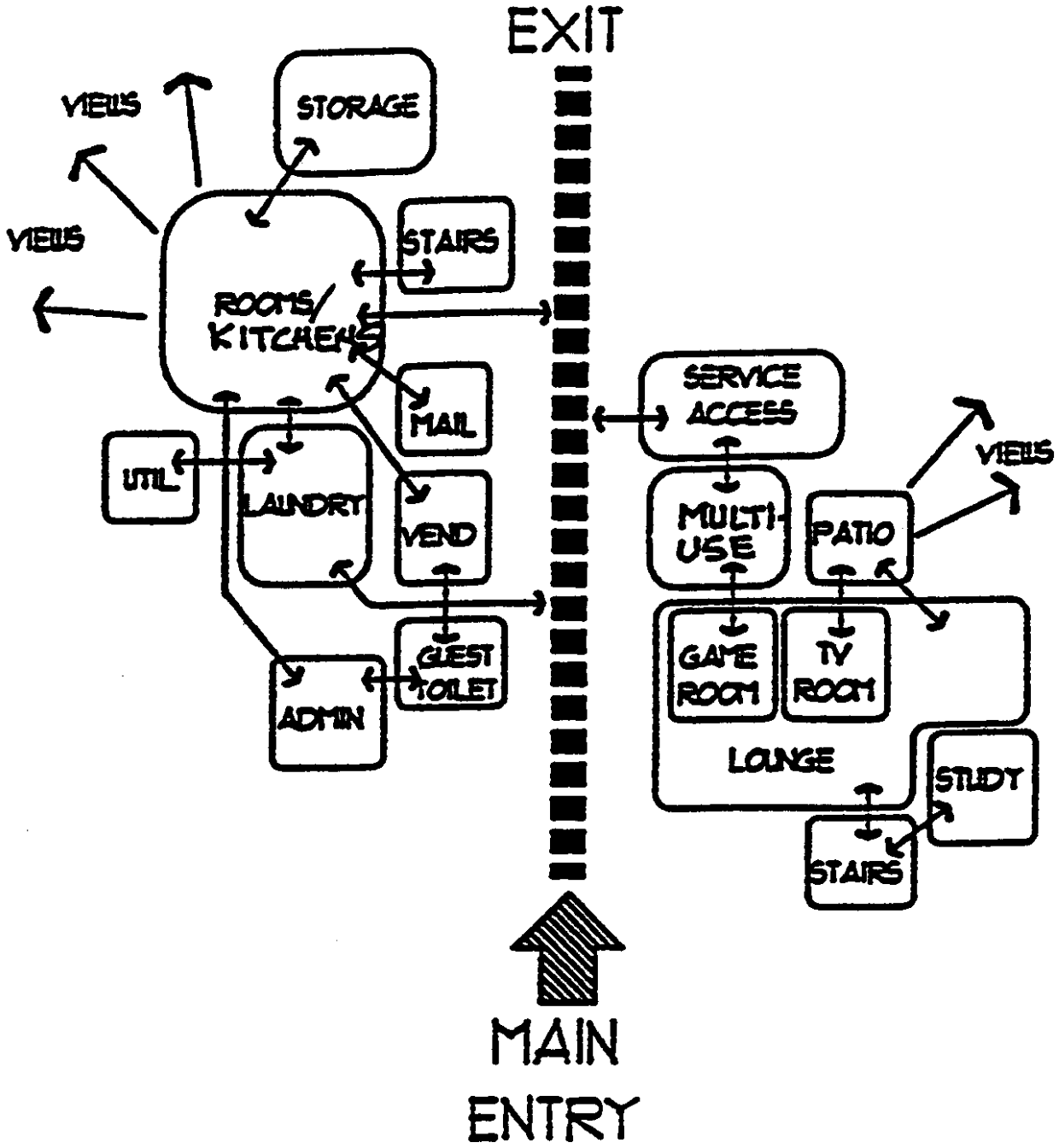


Figure 15. Functional Relationship Diagram

Dormitory design must take advantage of local climate conditions. Type B dormitories with exterior balconies lend well to solar shading in warm and temperate climates where heat gain through windows is a concern. Type A dormitories with central hallways are more energy efficient due to their limited number of openings to the outdoors. Where practical, use passive solar construction techniques to reduce energy consumption. Designing to meet local climate conditions can often be overridden by other site organization issues such as the creation of outdoor space, building scale or orientation to other facilities.

See Figure 15 for functional area relationships.

2. Architectural Character and Scale

The architectural character of the facility must be in context with its surroundings. It must relate not only to the immediate site and adjacent buildings, but also to the base itself. The desired architectural character is usually defined in the base architectural compatibility standards which most installations have published. These standards provide a basis for compatibility and order within the built environment. The intent of these standards is not to create "sameness", but to promote a sense of harmony and a respect for local and regional design and architectural characteristics. The following elements are part of a successful design solution:

Regional Character

Well-designed dormitories respect the characteristics of the built environment in the local region through architectural style, choice of construction techniques and materials, and form. Some of the local influences that affect regional character fall in these categories:

- Historic
- Ethnic
- Cultural/Traditional
- Topographic
- Climatic

Compatibility

Achieve architectural compatibility and appropriate proportions by integrating a vocabulary of scales, forms, color palettes and materials that blend with and respect the built and natural environments. The result is a combination of facilities that compliment each other and create balance and harmony. Architectural compatibility guidelines are not intended to compromise design expression, but rather to provide a framework for the development of quality design.

Architectural Scale and Mass

Architectural scale is defined as the comparative relationship of a structure or space to the human form. Individuals perceive a sense of personal comfort based on influences from their physical environment. Those environments that enable a person to feel comfortable and accepted as a part of the environment are considered to possess a "human" scale. The relative proportions, height, form and bulk of a building or space, as well as its formal relationship to other buildings or spaces contribute to achieving this sense of scale. Dormitories should provide a "residential" environment with an architectural scale that imparts a clear sense of relative comfort, ease, and satisfaction. This can be achieved by using standard residential ceiling and window sill heights, avoiding oversized entrance canopies, structural elements, and other artificially oversized building elements.

Building mass is defined as the overall bulk or total volume of space a building occupies. Large buildings such as dormitories, aircraft hangars, and maintenance facilities often have a greater mass than other buildings on a base. Modulating the form and facade of these buildings with setbacks, repetitive details, and less dominant colors softens their physical appearance and enables a blending of facilities in terms of their form, proportion, and perceived size. The size, shape, proportion, repetition, and placement of design features such as fenestrations, roofs, columns, etc., are elements that combine to project the architectural character of a building.

3. Management

Most dormitory programs require an office for the dormitory manager. Locate this office near the main entrance for convenient access by the residents. Consider use of electronic key card systems restricting access to dormitories for authorized residents only.

4. Privacy

An overwhelming percentage of respondents in the Enlisted Personnel Community Focus Groups asked for a "private home away from their work environment" and cited this as a major impetus for living off base. Refer to page 31 for a comparison between the three types of dormitories in relation to privacy.

5. Flexibility and Expansion Potential

Design enlisted dormitories with the flexibility to accommodate enlisted personnel in all grades. This requires designing the room-bath-room modules to facilitate easy, economical conversion from a module housing two residents to a module occupied by just one resident. Living modules should also be designed for conversion to private apartments as proposed by Vision 2020. See Chapter 5. Allow for such conversions with minimal demolition or relocation of building systems. Expansion potential for dormitories usually involves the addition of more living units. It is generally impractical to build an addition onto an existing dormitory building. If the potential for adding additional living units to a dormitory project is identified during the initial programming stage, allow space in the site development plan for additional structures and size site utilities accordingly.

6. Interior Design

See Table 4. Suggested Surface Finish schedule.

Comprehensive Interior Design

The goal of the designer is to provide a total quality residential facility. This residence will be occupied by either gender and by a diverse age group.

The interior design and architectural design of the facility must be integral and related. All dormitory design projects shall include Comprehensive Interior Design (CID) services. CID services may be provided as part of the A/E's design service, commercial design service, or by in-house Air Force interior designers. CIDs should reference base quarters improvement plan (QIP) for base-specific information on furniture styles, color schemes, and project specific guidance.

Quality of Life

The interior design has a direct impact on the quality of life for the occupants. Interview typical dormitory residents in the location of the facility for invaluable feedback. Consider including the residents in design reviews.

Allow flexibility for the facility occupants to personalize their units. This includes freedom in furniture arrangement, choice of window and bed coverings, and display of artwork and hobbies. Give increased attention to the high-tech personal environment that characterizes today's life-styles, such as computers, audio-visual equipment, cable television, etc.

Finish Materials and Colors

Select neutral colors for surfaces that will have a long life, such as ceramic tile, laminates, window blinds, etc., to facilitate future finish material upgrades. Provide a pleasing color scheme in durable finish materials. Use color in non-permanent finishes to add interest and vitality, but do not allow color to dominate the environment. Coordinate materials, finishes, color, and texture selection to complement the overall building design and image.

Carpet

Carpet with a small pattern, tweeded design or random design is preferred for its appearance retention. Solid color carpet is not authorized. Level loop or a combination or loop and cut pile carpet is recommended for corridors. Select a pattern that will not accentuate the length of the corridor. A cut pile is recommended for the living unit. Provide a soil walk-off area if the living unit opens to the exterior. Heavy-duty commercial quality carpet cushion may be used in the living units, but cannot be used in the corridors. Carpet over cushion should be applied with the "double stick" method.

Living/bedroom areas have a heavy wear classification for carpet, and public areas (corridors, television and game rooms, etc.) have a severe wear classification.

The following minimum weights are recommended for dormitories:

- Cut pile: 1017 grams/m^2 (30 ounces/SY)
- Bonded: 949 grams/m^2 (28 ounces/SY)
- Loop pile: 814 grams/m^2 (24 ounces/SY)

Provide hard surface walk-off areas at exterior entrances, whether at public entrances or private entrances to Type B or C modules.

Hard Surface Flooring

Use commercial quality sheet vinyl or vinyl composition tile (VCT) with a full-depth pattern in the walkoff area, vanity area, and the kitchen. Avoid white as a predominant color. “No wax” surfaces are not recommended, due to low durability.

Walls

Exposed concrete masonry units (CMU) is unacceptable as an interior wall finish. Use vinyl wall covering over smooth walls. Accent walls are optional, but must not be so bright or so dark as to shorten the room or negatively effect the interior lighting. Consider a texture wall covering as an accent instead of dramatic contrasting colors. Accent colors can also be used in textiles such as draperies and upholstery fabrics. Paint may be substituted for vinyl wall covering (VWC), but VWC is preferred. Where paint is used, multi-colored, speckled paint systems are preferred.

Ceilings

Paint ceilings off-white or provide a light colored acoustical textured treatment. Avoid suspended acoustical tile ceilings, as they tend to convey a non-residential quality and are easily damaged.

Cabinets and Millwork

Built-in cabinets must be well constructed with sturdy hardware. Recessed pulls are preferred, but may not comply with ADA requirements. Such requirements apply to some overseas locations where civilians occupy dormitories. Finishes must be able to withstand frequent cleaning and coordinate with the other finish materials. Neutral colors are required for cabinets and millwork to facilitate future color scheme changes.

Bathrooms

Use slip resistant ceramic floor tiles in bathrooms. Specify a mottled or shaded tile to hide discoloration from detergents, etc. Use ceramic wall tile from floor to ceiling around bathtubs and showers. Colored grout matching the ceramic tile is recommended for low maintenance and good appearance. Other areas may be at wainscot height. Install shower curtain rod instead of glass shower doors for ease in maintenance. Specify rod at proper height for conventional shower curtains 1800 mm x 1800 mm (72" x 72").

Lighting

Use a combination of ambient, task, and ambient lighting in living units. Limiting fluorescent lighting to utility areas such as laundry rooms and vending/kitchen areas is preferred. Fluorescent tubes should be color-corrected. The designer must be cognizant of lighting for both day and night situations. Dormitories have historically suffered from poor lighting. Designers should provide the highest quality illumination within budget and life-cycle cost limitations.

Window Treatment

Mini blinds, vertical blinds, draperies or a combination are authorized. Consider solar conditions when selecting a window treatment. All window treatments must pass NFPA 701-1/702-2 Standard Method of Fire Test for Flame Resistant Textiles and Films. For ease of cleaning, drapery pleats that are either stack pleated, roll pleated, or accordion-type pleated are preferred instead of pinch pleated. The drapery lining must hang independently from the finished drapery treatment. Installation of blackout linings is recommended for all dormitories, but is optional, depending on local conditions. Traverse rods and blinds must be of commercial quality. Bedspreads must compliment the window treatments and carpet color, but need not match exactly since bedspreads are laundered more frequently.

Furniture Considerations

All furniture should match in style and finish. Furniture must be well constructed of solid hardwoods and veneers with steel frames where necessary and with plastic laminate top surfaces. Wood grain laminates are discouraged in favor of lighter shade laminates in patterns or solids. Recessed pulls are preferred, but may not comply with ADA requirements. Such requirements apply to some overseas locations where civilians occupy dormitories. Maximize storage capabilities. Provide a study area and a lounge chair for each occupant. Beds must be 2030mm (80 inches) long. Consider providing under-bed storage. While under-bed storage units enhance in-room storage capacity, they preclude use of box springs. Double beds are recommended where space permits. Lounge furniture must be extremely sturdy and is generally used for reading or watching television. Use individual lounge chairs and love seats instead of sofas to maximize placement flexibility.

Artwork and Accessories

Provide artwork for all public areas. Graphics and signage must be well-designed and coordinated with the architectural style and finish materials. Silk plants are authorized for public areas. Install chair rails where needed. Provide wall protection for recreational games such as dart boards and billiards. Provide nameplate signage with removable inserts to identify the occupants of each dormitory room, and provide an insert to allow a sign that indicates "day sleeper".

Space	Floor	Wall	Ceiling
Living Units			
Living/bedroom	Ca	WC, Pa	Pa, Ac
Bathroom	CT	CT, Pa	Pa
Vanity Area	VT, SV	WC, Pa	Pa, Ac
Entry	VT, SV, CT	WC, Pa	Pa, Ac
Kitchen	VT, SV	WC, Pa	Pa, Ac
Common Areas			
Entries	CT, SV, RT, VT, QT	WC, Pa, CT	Pa, Ac, Su
Corridors	Ca	WC, Pa	Pa, Ac, Su
TV, Game Room	Ca	WC, Pa	Pa, Ac, Su
Laundry Rooms	QT, VT, CT, RT, SV	Pa, LA	Pa, Ac, Su
Vending/Kitch.	QT, VT, CT, RT, SV	Pa, LA	Pa, Ac, Su
Storage rooms	VT, SC	Pa	Pa
Toilets	CT, VT, SV	Pa, WC, CT	Pa
Admin. Areas	Ca	WC, Pa	Pa, Ac, Su

Legend:

Floors:

VT	Vinyl Composition Tile
SV	Sheet Vinyl
CT	Ceramic Tile(sealed grout/slip resistant)
Ca	Carpet
SC	Sealed Concrete
RT	Rubber Tile
QT	Quarry Tile

Walls:

WC	Vinyl Wall Covering
CT	Ceramic Tile
LA	Liquid Applied Coating
Pa	Painted Drywall or Plaster

Ceiling

Ac	Acoustical
Pa	Painted
Su	Suspended

Table 4. Suggested Surface Finish Schedule (Options or Combinations)

7. Access for Persons with Disabilities

Design enlisted dormitories to accommodate the needs of able-bodied military residents. Provisions for persons with disabilities are not required in any of the living units. Provide access by persons with disabilities to all public spaces on the first floor of a dormitory building. Provisions to accommodate such access include:

- Access ramps
- Sufficient door widths
- Proper fixtures and clearances in the public toilets
- Drinking fountains and public telephones mounted at the correct height
- Designated parking spaces with convenient access to the main entry of the building.

The specific requirements for providing access and accommodating the special needs of persons with disabilities are published in the Uniform Federal Accessibility Standards. and the Americans with Disabilities Act Architectural Guidelines.

8. Special Considerations for Renovations

Renovations of dormitories range from relatively simple interior finish upgrades to complete demolition and reconfiguration of an existing dormitory. The requirements and recommendations set forth in this design guide apply to renovations wherever possible.

A common type of wholesale renovation project is to convert an existing Type A dormitory to a Type B facility. This involves replacing the gang bathrooms and the double-loaded interior corridors with semi-private baths. Access to the living units is provided by new exterior balconies and exterior stairways. This concept requires some flexibility in the construction standards due to existing column locations, limited building widths, small mechanical rooms, etc. Although some flexibility is allowed due to these constraints, renovation projects must as a minimum, provide the authorized net living area applicable to new dormitories. The net living area may **exceed** 11 m^2 per living/bedroom area provided such an increase in net living area allows reuse of more existing walls, doors, and other building elements than would occur if the 11 m^2 requirement was met exactly. In no case should the net living area per living/bedroom area be less than 11 m^2. This increase in net living area should not exceed five percent (11.55 m^2 or 124.3 SF.)

In some cases, criteria waivers are necessary due to existing conditions which cannot be altered. Such conditions should be brought to the attention of the responsible MAJCOM to request waivers from HQ USAF/ILEH.

The use of a dormitory, as well as the authorized net living area for the residents may change over time. Designers must take this into account, and design new facilities to allow easy conversion to another use, such as from an enlisted dormitory to visiting airman quarters or to a private efficiency apartment in accordance with Vision 2020 (see Chapter 5). This includes providing rough framing within a wall for a future door between two living/bedroom areas and configuring the plan for minimal demolition if the conversion is required.

C. Building Systems

1. Structural

Select an economical structural system based on:

- Facility size
- Projected load requirements
- Subsoil conditions
- Local availability of materials and labor
- Feasibility of prefabrication
- Local construction practices
- Resistance to fire, and wind, snow, seismic, geologic, and permafrost conditions

Recognize that dormitories are very modular and repetitive in nature; therefore, decisions concerning the structural system have substantial effect on construction costs. Coordinate column spacing and layout with the building's floor plan so that columns occur within or in alignment with walls. Keep columns within spaces to a minimum, and limit them to larger public spaces such as laundry rooms, etc.

Consider using bearing walls since past designs validate their economic advantages. Analyze the proposed structural system to determine if it is the most economical method of realizing the architectural design intent.

The design live load criteria for the design of dormitories should be as shown in Table 5.

Area	Kilograms per Square Meter	Pounds per Square Foot
Room-Bath-Room Modules	195	40
Television and Game Rooms over 55 m2 (600 SF)	488	100
Television and Game Rooms under 55 m2 (600 SF)	293	60
Corridors and Balconies	293	60
Offices	244	50
All other areas	488	100

Table 5. Design Live Load Criteria

2. Heating, Ventilation and Air Conditioning (HVAC)

The design of the HVAC system must comply with the criteria set forth in MIL-HDBK-1190, Facility Planning and Design Guide (Sept. 1987), Chapter 10, Air Conditioning, Dehumidification, Evaporative Cooling, Heating, Mechanical Ventilation, and Refrigeration. The following is provided in addition to and in cases of conflict takes precedence over the above guidance.

In humid areas special design and construction considerations are required. These considerations are not limited to HVAC systems. Refer to Engineering Technical Letter (ETL) 93-2: Dormitory Criteria for Humid Areas for specific guidance. Humid areas are defined as having over 3000 hours of 19^0C (67^0F). F or higher wet bulb temperatures in combination with an outside design condition of 50 percent relative humidity or higher, or over 1500 hours of 23^0C (73^0F) or higher wet bulb temperature in combination with an outside design condition of 50 percent relative humidity or higher, based on 2.5 percent dry bulb and 5 per cent wet bulb temperatures.

System Selection

The selection of HVAC system is to be based upon the lowest total life cycle costs: include initial costs, operating costs, energy costs, system maintenance, repair and component replacement if not expected to achieve the same life cycle of the systems under considerations. The HVAC system must be designed to ensure that building energy consumption does not exceed DoD energy budget figures Use of a central plant should be considered for dormitory complexes. A central facility housing heating and cooling equipment reduces maintenance and capitalizes on the higher efficiency of larger capacity commercial equipment.

Maintenance

Maintainability of the system is critical to the continued quality of life of the occupants. Access to the systems must minimize disruption to the occupants and maximize servicing efficiency. The mechanical systems must comply with ETL 88-4: Reliability and Maintainability (R&M) Design Checklist. HVAC units will be located within the mechanical closet/space to ensure that filters, controls, drain pans and condensate piping, control valves and coils are easily accessible for servicing and cleaning. Condensate piping will be equipped with traps and threaded clean outs at the unit. Design drawings must detail these features including minimum clearances for maintenance.

Ventilation Air

Provide a central ventilation system to supply conditioned outside air to each room or each module's HVAC unit. Equip all branch ducts with accessible volume control dampers. Each module will be supplied continuously with conditioned outside air to meet the current ASHRAE Standard 62 or as required for building pressurization, which ever is larger. If provided to each module's HVAC unit, the module's HVAC unit's fan must run continuously.

Bathroom exhaust

Bathrooms maybe equipped with a central exhaust system or individual, directly vented, switched, bath exhaust fans. System selection shall be based upon a life cycle cost analysis. If a central ducted bath exhaust system is utilized, the exhaust system shall:

- Run continuously and be interlocked with the building supply air system.
- The exhaust duct for each space shall have a manual volume damper accessible from the space for proper balancing.
- Be evaluated for utilizing heat recovery from the exhaust system to precondition ventilation air.

Module HVAC Units

When room modules are equipped with individual HVAC units, they shall be ducted vertical fan units placed within designated mechanical closets or mechanical rooms equipped with lockable doors. Through-the-wall units and units located in the ceiling space are discouraged for maintenance reasons.

- Supply air: Supply air shall be ducted to the sleeping rooms and common area. Branch ducts shall be equipped with balancing dampers.

- Control: Control shall be provided by a single thermostat located in the common area.

- Return Air: Provide ducted return or transfer from sleeping areas, do not use ceiling space as return air plenums. Return air through closet and storage areas. Provide closet and bathroom doors with louvers sized for volume of transfer/return air. Evaluate need for transfer/return air sound attenuation between sleeping room and common areas.

Piping System

Where air conditioning is authorized and centralized hot and chilled water utilized, individual HVAC units should be connected to a centralized mechanical system by a 4-pipe hot water and chilled water distribution system to provide positive space control.

Perimeter Fin Tube Heating

In areas where perimeter fin tube heating is utilized, provide temperature control for each zone.

Kitchen Area

Provide kitchen area with a minimum of 2.54 L/s per m^2 (0.5 cfm/SF) of supply or transfer air continuously. Equip all kitchens with a range hood that exhausts directly to the outdoors. Recirculating exhaust hoods are not allowed for new dormitories, but are allowed for major renovation projects where running ductwork from the kitchen to the outside of the building is difficult. Where practicable, use direct exhaust systems for renovation projects as well.

3. Plumbing

Provide the following as required:

- Domestic hot and cold water
- Sanitary and storm drainage
- Propane or natural gas
- Steam or hot water
- Chilled water

Provide hot and cold water to all public toilets, bathrooms, kitchens, sinks, janitor closets and laundry rooms. Provide shut-off valves at all fixtures. Tank type, low water volume toilets are required in all bathrooms. Provide elongated bowl toilets with a closed-front seat and a lid. Toilets and bath fixtures must match and be neutral in color.

Provide hose bibbs on all exterior walls of each building at 50-foot intervals, freeze proof as dictated by climatic conditions. Provide floor drains in all toilets, bathrooms, janitor closets, and laundry rooms.

Provide a separate water heating system for centralized laundry rooms. In designs where multiple small laundry rooms are provided, separate hot water systems are not required.

Provide at least one drinking fountain on each floor of the dormitory.

Plan plumbing systems for dormitories to take advantage of stacking bathrooms and placing fixtures back-to-back. Mechanical engineers, architects, and structural engineers must work together to carefully plan the size and location of plumbing chases with minimal impact on usable living space. Consider collocating plumbing chases with exhaust risers serving each room.

4. Electrical/Communications

Provide the following as required:

- Distribution equipment
- Electric, telephone, and local area network wiring
- Receptacles and grounding
- Interior and exterior lighting
- Emergency lighting
- Fire detection and enunciation
- Cable television
- Intrusion detection systems.

Base electrical system design calculations on multi-family occupancy rather than a hotel occupancy since the dormitory is the full-time home of the residents, and therefore has a higher demand factor.

Provide metering for electric power. Provide a minimum of five quadraplex outlets per living/bedroom area, mounted 300 mm (12 inches) above the floor. Provide three-way switches at the entrance door and in the vanity area so that the living/bedroom area lighting is controlled at either location. Likewise, provide three-way switches at each bathroom door to control the bathroom light fixture.

Prewire and provide one cable television outlet and one telephone jack in each living/bedroom area. Locate jacks for maximum furniture placement flexibility. Provide one wall-mounted public telephone per each 20 modules.

Provide one dedicated communication/data connection in each living/bedroom area. Prewire the connection if specific communication/data requirements are known.

Provide incandescent or fluorescent ambient lighting in each dormitory room. Incandescent fixtures with dimmer switches are recommended for the living/bedroom area. Fluorescent fixtures on the underside of kitchen wall cabinets are recommended to provide task lighting and supplement ambient lighting. The use of fluorescent fixtures in dormitory rooms is allowed, but must be carefully selected to fit into the residential environment. Fixtures in dormitory rooms must not appear "institutional". Do not rely solely on table lamps for room lighting. Ambient light level at desk height must average 50 foot candles in each dormitory room. Provide overall ambient lighting in addition to task lighting. Conceal all wiring; exposed wire mold or conduit is not allowed.

Provide exterior lighting of parking areas, building entrances, and walkways. See Chapter 2 for more information concerning exterior lighting. Use the National Electrical Code, the IES Lighting Handbook, and NFPA 101 Life Safety Code for lighting calculations. Provide one exterior light fixture outside each room entrance door for Type B dormitories.

5. Fire Protection/Life Safety

Fire protection systems must conform to MIL-HDBK-1008, Fire Protection for Facilities Engineering, Design and Construction, and to National Fire Protection Association (NFPA) fire codes. Based on the Uniform Building Code, the 1+1 module dormitory is classified as an efficiency apartment with an R-1 occupancy. Based on the Life Safety Code, this occupancy is classified as an apartment building. Modules must have smoke alarms and each module requires a sprinkler system due to kitchen cooking equipment. This sprinkler system reduces fire separation requirements to three-quarter hour fire rated corridor walls and no required fire rated separation between living/bedroom areas or modules. Facilities will be of Type II, noncombustible construction as defined by NFPA 220 Standard of Types of Building Construction.

All new dormitories and major dormitory renovation projects must be protected throughout by an approved supervised automatic sprinkler system installed in accordance with the requirements specified in NFPA 13 or 13R as appropriate and other fire codes referenced therein.

Each new dormitory kitchen, living/bedroom area (and living area in the case of a suite) must be provided with an approved single station smoke detector and heat detector powered from the building electrical system. Existing one and two-story Type B dormitories without sprinkler protection must have heat detectors installed in addition to smoke detectors.

Ensure that audible fire alarms are easily heard within the living units. This may require more or louder audible alarms than normal because of the sound attenuating construction found in dormitories.

Provide a Class I standpipe system at stairwells of dormitories 4 stories or greater in accordance with NFPA 14. Standpipes consist of a 63mm (2.5 inch) outlet at the first floor and two 38mm (1.5 inch) outlets at the other floors. The outlet must have national standard threads.

Provisions for life safety must conform to the requirements found in NFPA 101, Life Safety Code, latest edition.

Travel distance to exits is of particular concern in designing dormitories. The placement of stair towers or stair wells must be part of the preliminary building planning process. Minimizing the number of stairs required can be achieved by maximizing allowable travel distance in the design. This requires determining the maximum number of living units which can be served by one stair while still conforming to the maximum allowable travel distance. The elimination of stairs must be tempered with the need for privacy. Fewer stairs can result in more traffic being funneled past module entrances in a Type B dormitory.

The construction of fire walls, ceiling and floor assemblies around each living unit is another issue of paramount importance to dormitory design. The construction of such assemblies as required by NFPA 101 must be closely coordinated with the sound attenuating techniques used.

The 1+1 module occupancy is classified by the Uniform Building Code as an efficiency apartment with an R-1 occupancy. This occupancy is classified as an apartment building. Living/bedroom areas must have smaoke alarms, and modules require sprinkler systems due to the cooking equipment. The sprinkler system reduces fire separation requirements to three-quarter hour fire rated corridor walls and no fire rated walls between living/bedroom areas or modules. In most cases, however, the fire rating of such walls will be enhanced by virtue of noise isolation requirements.

6. Acoustics

Careful attention to acoustic design is required for dormitories to ensure a high degree of privacy for residents within their living units and study areas. Designers must address isolation of noise from a variety of sources, including:

- Adjacent living units
- Units on a floor level above or below
- Hallways and balconies
- Mechanical rooms and systems
- Exterior-generated sound such as aircraft and automobile noise

Walls between living units and between living units and corridors, and exterior walls of living units must have a Sound Transmission Class (STC) of at least 50. Floor and ceiling assemblies must have an STC of at least 55 and an Impact Insulation Class (IIC) of at least 60.

Telephone, cable television, convenience outlets, and mechanical ducts must not compromise the acoustical integrity of wall, floor, or ceiling assemblies. Fluorescent lamp ballasts must be selected to minimize noise generation.

7. Architectural Systems

Select reliable, conventional building systems for dormitories, and use building materials and finishes that are durable and easy to maintain. Architectural systems must be selected based on their aesthetics, simplicity, and economic characteristics.

Windows

All living areas and places of assembly must have operable windows to provide natural ventillation. Use tight-fitting, insulating, commercial grade windows for dormitories. Light-duty residential grade windows are not acceptable. Low emmisivity (Low E) glazing is recommended for increases thermal performance, ultraviolet retardation, and maximum light transmission. Install heavy-duty insect screens on all operable windows. Size windows at between 10 and 15 percent of the floor area they serve. Windows serving residential units must be operable and sized for emergency egress. Consider installing European style rolladens (roll-up shutters) to provide more privacy, security, and noise reduction. All windows must be compatible with the type of window coverings to be used. In Type B dormitories, provide sufficient mullion width between the door and window jambs to install light switches.

Doors

All exterior doors must be fully weather-stripped and include a heavy-duty metal threshold which prevents drafts, dirt, water, and insect entry. Exterior doors must be thermally insulated. Entry doors for Type A dormitory modules should be sound-insulated and must have a peephole for viewing visitors. Provide keyless (credit card type) locksets for all module entry doors. Entry doors should be 900 mm (3'-0") wide, closet and bath doors should be 600 mm (2'-0") wide, and doors between living/sleeping areas and kitchens should be 750 mm (2'-6") wide. Do not use hollow core wood doors in dormitory construction.

Moisture Control

Special construction considerations, not limited to HVAC systems, are required for dormitories in humid areas. Refer to Engineering Technical Letter (ETL) 93-2: Dormitory Criteria for Humid Areas for specific guidance.

Exterior Finish Materials

Designers must consider durability, functionality, economy, low maintenance requriements, and architectural compatibility when selecting exterior finish materials. Many dormitories are constructed of load-bearing CMU exterior walls with a brick veneer finish. Other dormitories are built with single wythe split faced or ribbed CMU. In both cases, the CMU wall is furred with gypsum board on the interior of the modules. Some dormitories have successfully utilized exterior insulation finish systems (EIFS) as the primary exterior wall finish. While this is a good system in terms of thermal performance, integral color, and moisture penetration, designers must specify heavy-duty reinforcing mesh at all areas subject to impact damage.

Roofing

Unless the installation's architectural compatibility standards state otherwise, all dormitories should have sloped roofs. Not only does this ensure positive drainage, sloped roofs impart a more residential image than do flat roofs. Standing seam metal roof systems have excellent performance characteristics, but must be in context with the architectural compatibility standards. Composition shingles and clay tile roofing may also be appropriate. Avoid using tapered roof insulation to achieve slope.

Chapter 4 - Functional Area & Space Criteria

A. General

1. Functional Areas

This chapter presents criteria applicable to the design of each function area of an enlisted dormitory. These include:

Required Areas

- Living/Bedroom Area
- Vanity
- Bath
- In-room Storage
- Kitchen
- Laundry
- Utility Space
- Mail Service*
- Bulk Storage
- Circulation Space

* Required in locations where USPS delivers to base housing

Optional Areas

- Multi-purpose Space
- Game Rooms
- Fitness/workout rooms
- Vending Areas
- Guest Toilets
- Vending/Kitchenette Area
- Guest Toilets
- Supply Storage
- Administration Area

2. Basic Requirements

Primary design considerations are presented for each functional area indicating the anticipated use, performance, organization, character, and relationships of specific areas. Criteria are included herein for size and critical dimensions, storage requirements, furnishings and equipment, and technical requirements.

3. Basic Configurations

Type B dormitories with private access to individual living units from exterior balconies or sidewalks may give the perception of increased privacy. They convey a feeling of an individual apartment rather than the hotel-like feeling presented by a Type A dormitory with interior corridors. Type B dormitories can benefit aesthetically from the articulated facades created by balconies. Type A dormitories usually present a greater challenge to the architect due to their typically flat facades. It is important to note, however, that residents in Type B dormitories tend to close their window coverings to gain privacy from outside walkways. This results in less use of natural light. Type B dormitories have the additional advantage of more centrally located plumbing systems where toilets are grouped back-to-back down the center of the building without being interrupted by a corridor. In Type A dormitories, the view from living unit windows can be directly to the exterior without having to look across a balcony. Type A configurations generally support interior socialization, while Type B configurations support outside social interaction and interior separation. Type C garden apartment style dormitories offer the greatest degree of privacy, since stairways access a limited number of modules. In most configurations, Type C dormitories have only four modules per floor accesses by each stairway.

Most Air Force enlisted dormitories are three stories in height. This configuration maximizes the efficient use of available real estate and avoid the additional fire protection, inconvenience to occupants, and structural and life safety cost associated with buildings over four stories in height.

Designers should recognize the importance of minimizing the exterior wall area of the dormitory. This practice not only reduces construction costs, but reduces life-cycle energy costs as well. The examples shown in Figures 1, 3, 5, and 7 are all fairly deep modules with minimal exterior wall area. Figures 2, 4, and 8 are wider and less efficient with more exterior wall area. The example shown in Figure 8 is the most efficient of all due to the back-to-back configuration of the living/sleeping areas. The other examples have the living/sleeping areas arranged side-by-side.

4. Applicability

The design criteria that follows applies to Type A, Type B and Type C dormitories unless noted otherwise.

B. Residential Areas

1. Living/Bedroom Area

This area is the net living space for one E1 through E4 is shown graphically by the shaded areas in Figures 2 through 10. Consider the following:

- Ceiling height must be at least 2440 mm (8-0"). Do not use lay-in acoustical tile ceiling systems.

- If CMU construction is used for exterior walls or interior partitions, it must be furred with 13mm (1/2") or thicker gypsum wall board.

- Provide wide-angle peepholes and deadbolts on all module entrance doors. Provide automatic door closers on entrance doors for Type A dormitories. Type B and C entrance doors do not require automatic closers. Provide a keyless (credit card type) entry door lockset with an intregal deadbolt and master entry cabability (either by key or card). Type A dormitory entrance doors require sound insulation. Exterior doors require thermal insulation.

- The minimum dimension of the living/bedroom area should not be less than2840 mm (9'-4"). Minimize doorways or openings in perimeter walls in order to enhance flexibility in furniture arrangement. See Figures16 through 19 for typical living/bedroom layouts.

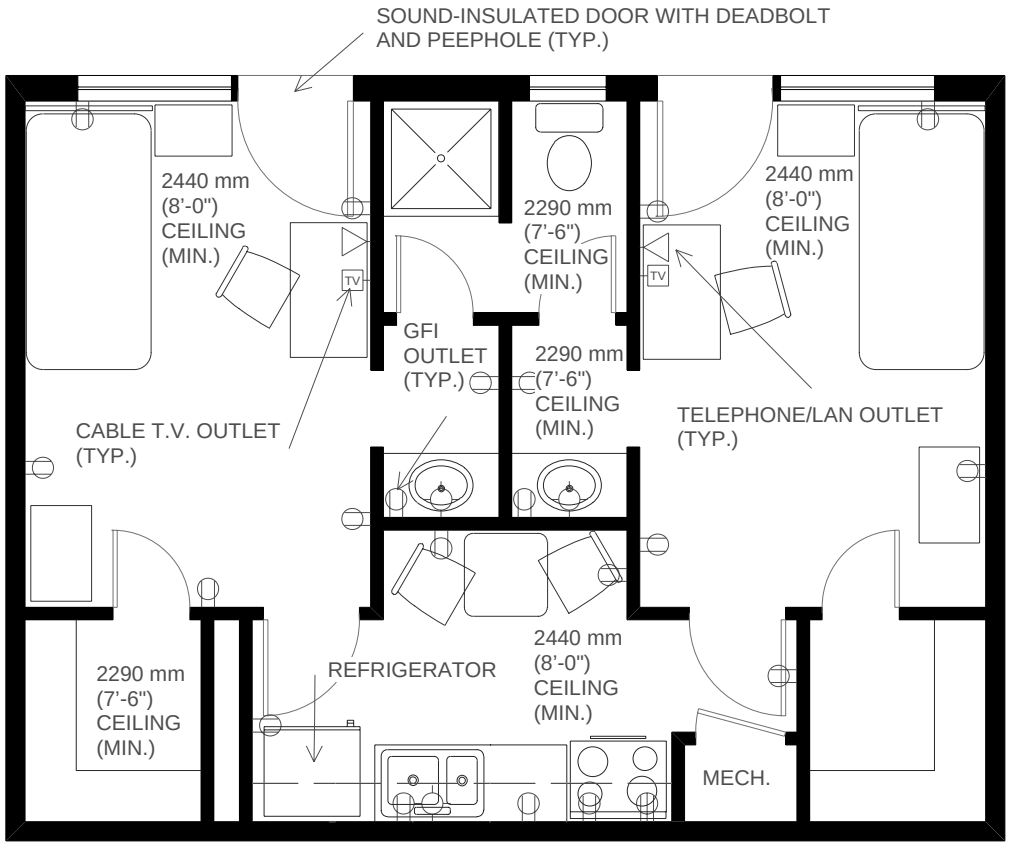


Figure 16. Typical Type B Module Furnishings/Outlets

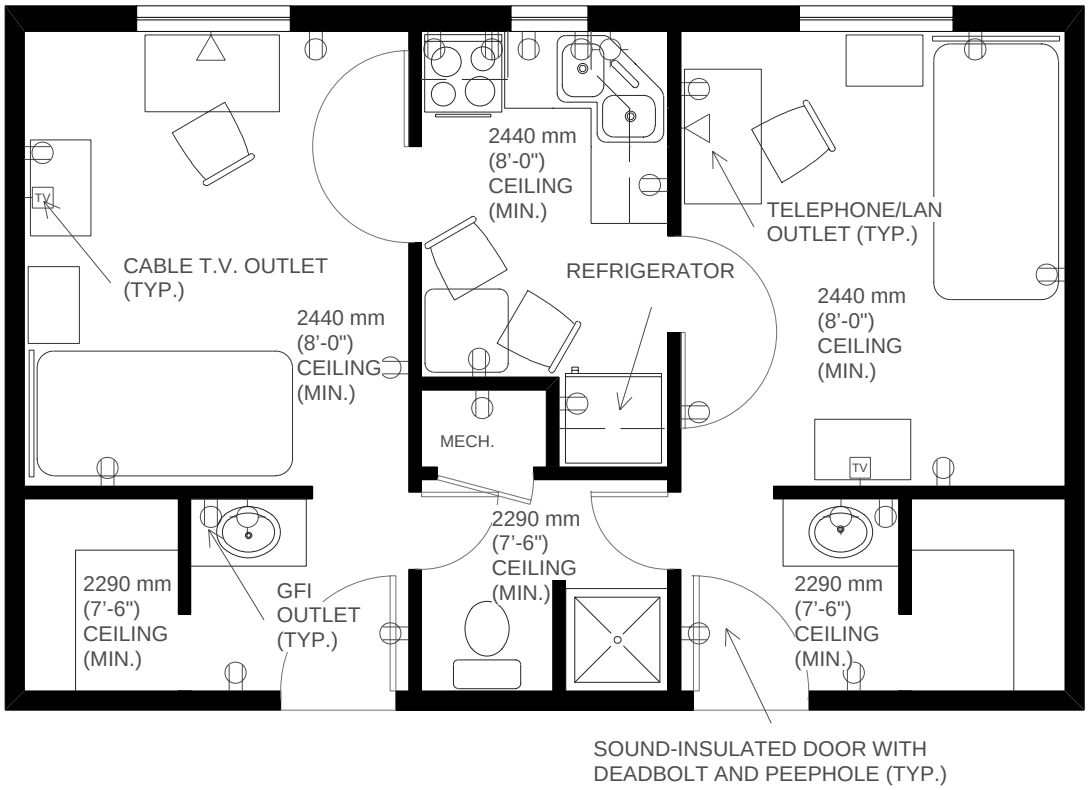


Figure 17. Typical Type A Module Furnishings/Outlets

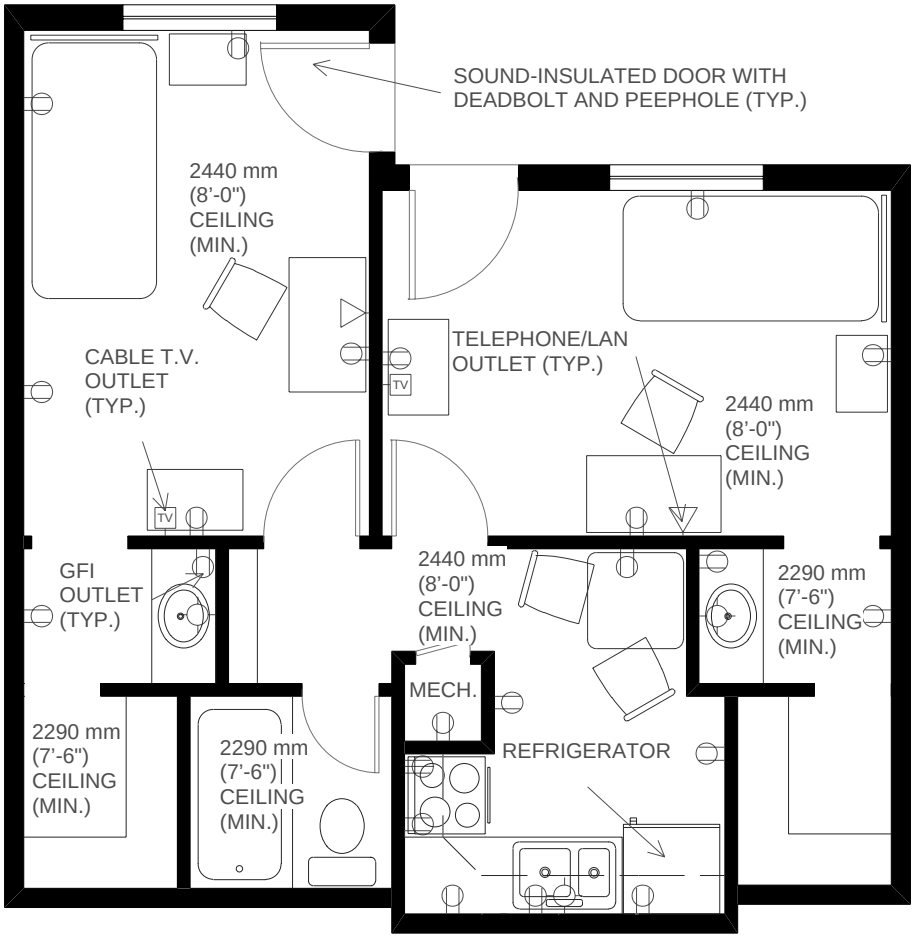


Figure 18. Typical Type C Module Furnishings/Outlets

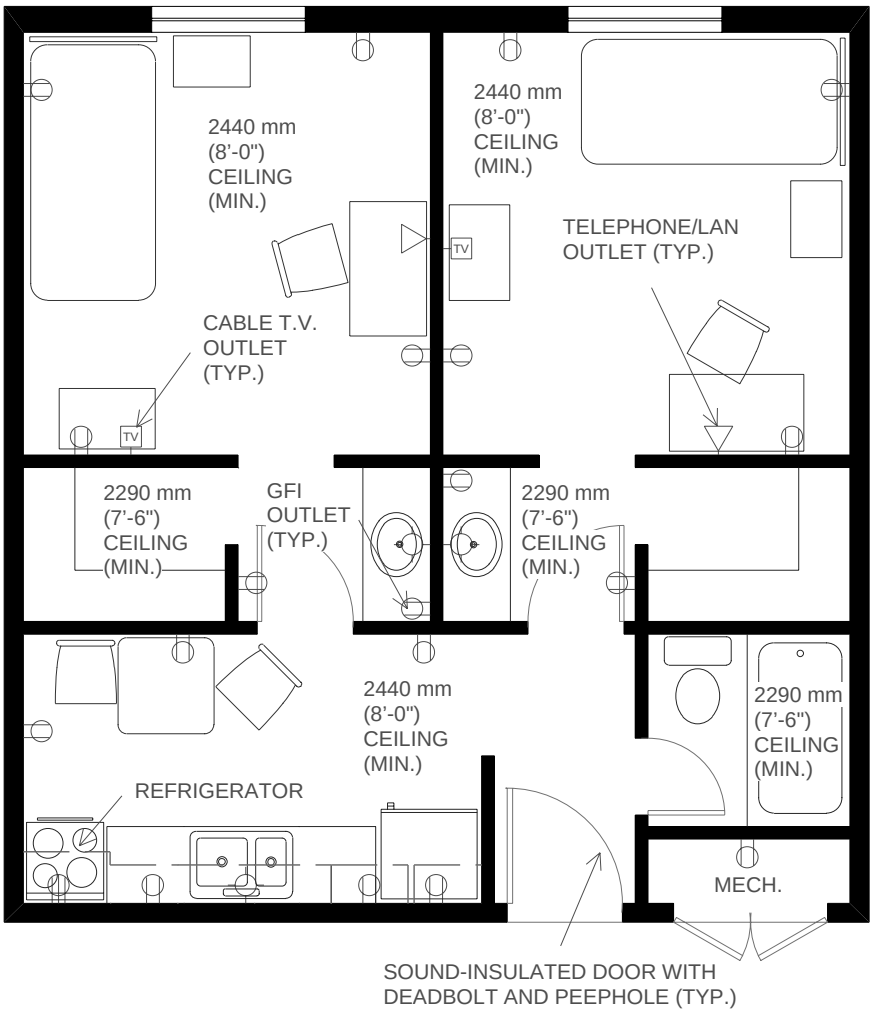


Figure 19. Typical Type A Module Furnishings/Outlets

2. Vanity Area

The occupant of each living/bedroom area shall have a private vanity. This may be located within the living bedroom area or off the common space, but must be separate from the bathroom. Plan this area to make the most efficient use of very limited space. Include the following:

- Provide a full-length mirror on the vanity side of the door leading to the closet.

- The vanity must be at least 1050 mm to 1200 mm (42" to 48") wide and must have a plastic laminate top with either an enameled cast iron drop-in lavatory or an integral cultured marble bowl and countertop. Provide an integral backsplash. The vanity counter top should be775 mm to 900 mm (31" to 36") above the floor.

- Vanity base cabinets must contain a minimum of two 200 mm wide by 75 mm high (8" x 3") high drawers with the remaining area under the vanity given to storage accessed by cabinet doors.

- Provide a full width mirror above the vanity. Provide overhead built in storage cabinets which match the vanity base. Mount a residential incandescent or fluorescent light fixture providing at least 75 footcandles illumination on the underside of the storage cabinets. This fixture may have single or multiple lamps.

- Install one medicine cabinet with at least 39, 329 cm^3 (2400 cubic inches) of interior area to the side of the mirror. At least three adjustable interior shelves are required. The medicine cabinet doors must be finished to match the vanity base.

- Provide a duplex GFI convenience outlet near the mirror. Size circuits to accommodate 1200 Watt hair dryers, etc.

- Provide one wall-mounted towel bar in each vanity area. Each bar must be at least 600 mm (24") long.

- Provide a single-lever ceramic cartridge washerless faucet at each lavatory.

See Figure 20 for a typical vanity/bath area layout. See Figure 21 for a typical vanity area interior elevation.

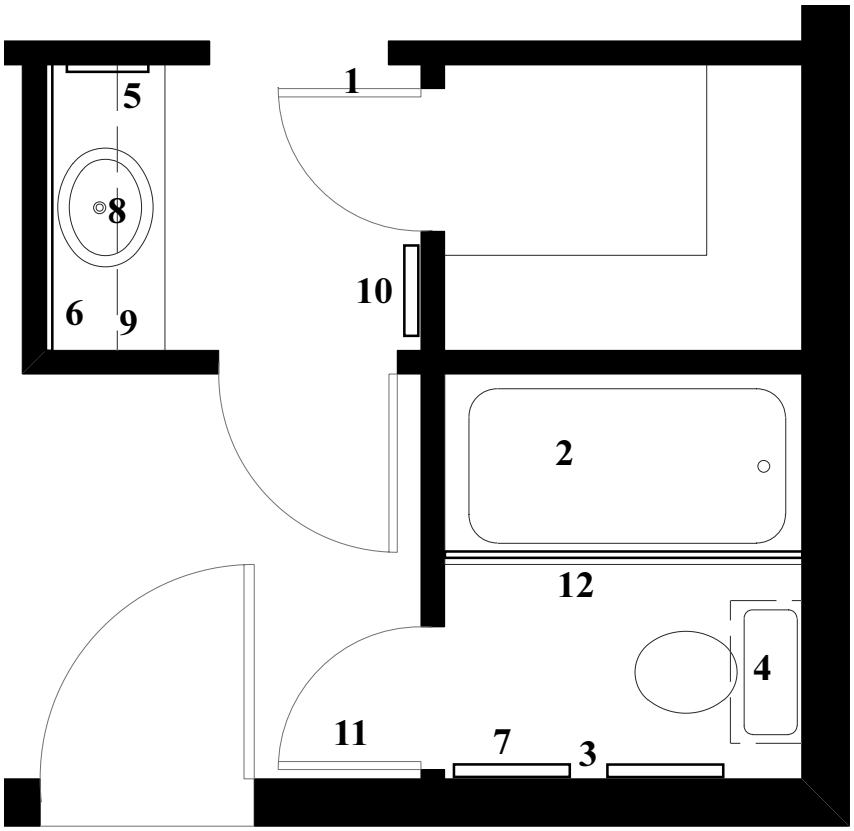
3. Bathroom

- For modules with two doors into the bathroom, the selection of the locksets is critical. Residents must be able to lock their bathroom door from inside their room. To avoid lockout problems while still maintaining security of the living/bedroom areas, both locksets should be key lockable from the living/sleeping area side only. Do not provide a push-button or latch lock on the bathroom side. To give residents a limited measure of privacy when in a bathroom having two doors, provide a deadbolt above the lockset which has thumb-latches on both sides. With this configuration, a suitemate cannot walk in on someone in the bathroom without at least turning the thumblatch from the living/bedroom side. This confusing lockset/deadbolt arrangement can be avoided altogether by having only one door to the bathroom accessed from a common area. This configuration requires only a privacy lockset which is locked by a push-button or latch from the bathroom side. Where only one door to the bathroom is provided, this door should be isolated from the kitchen to the greatest extent possible.

- A shower/tub combination is preferred in all bathrooms. Major Commands may elect to specify combination showers only. Use enameled cast iron tubs mounted with tub hangars. Glass fiber reinforced tubs are not allowed. Glass shower doors mounted on tubs are not encouraged due to increased maintenance and cleaning requirements. Provide a heavy-duty shower curtain rod.

- Provide a pulsating shower head connected to a flexible hose in each tub/shower. The shower head must fit into an adjustable-height holder mounted on a vertical rod to allow height adjustment over a wide range.

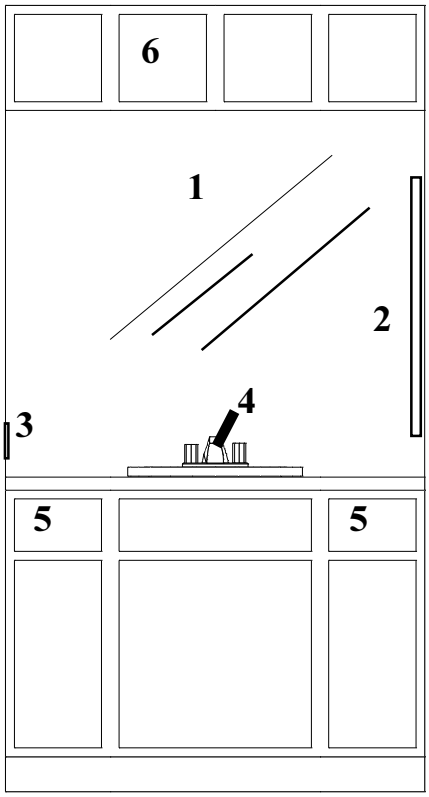
- Provide two towel bars. Each bar must be at least 600 mm (24") long.



Legend:

1. Full length mirror on outside of closet door
2. Enameled cast iron tub or shower with pulsating adjustable height shower head on vertical rod
3. Recessed ceramic toilet tissue holder
4. Storage cabinet above toilet
5. Recessed medicine cabinet with 3 adjustable shelves
6. Full width mirror
7. 2 towel bars
8. Sink with single lever faucet
9. Ground fault interupt (GFI) outlet
10. 1 towel bar
11. Robe hook on inside of bath door

Figure 20. Typical Vanity/Bath Area



Legend:

1. Full width mirror
2. Recessed medicine cabinet with 3 adjustable shelves
3. Group fault interrupt (GFI) outlet
4. Sink with single lever faucet having ceramic valves
5. Drawers
6. Storage cabinets above mirror with light fixture beneath, either fluorescent or incandescent

Figure 21. Typical Vanity Area Elevation

- Provide one robe hook on the bathroom side of the bathroom door.

- Provide replacable plastic shower caddies for the tub/shower area. Built-in soap dishes or storage recesses are discouraged because they are difficult to clean.

- Provide a wall mounted storage cabinet with doors above the wainscot over the water closet. The finish of this cabinet must match the vanities.

- Provide a heavy-duty, recessed ceramic, wall mounted toilet tissue holder near the toilet.

- Allow space beside the toilet for a standard-size plastic trash can.

4. In-Room Storage

Recent surveys indicate that a very high percentage of dormitory residents would like additional storage space, expecially within their room.

Each living/bedroom area must have a minimum of 1.86 m^2 (20 SF) of closet space. This requirement is met for new dormitories with a single walk-in closet measuring 1200 mm by 1500 mm (4' x 5'). Designers have the option of splitting the minimum area among two or more smaller closets for major renovation projects. Provide at least one closet convenient to each living/bedroom area. They are normally accessed from the vanity area.

Closets must have minimum interior dimensions of 600 mm deep by 1050 mm wide by 2250 mm tall (24" x 42" x 90"). Where doors are provided, provide solid core wood doors with heavy duty hardware. Use standard builders hardware. Where closets are accessible only from the living/bedroom area, only a passage set is needed. Closet doors are optional, but are recommended when the closet contents would be readily visible. Plrovide at least one clothes rod with a shelf above in each closet. The total length of hanging space must not be less than 2400 mm (8 feet). Closet organizer systems which have double clothes rods and shelves are highly recommended to maximize the efficiency of closets. Space may be provided in the lower part of the closet for movable drawer units which are moved out of the closet into the living area at the resident's option.

5. Kitchen

The kitchen provides residents with a quality of life similar to enlisted personnel occupying military family housing or living off base. Two E-1 through E-4's will share the kitchen. All built-in equipment must be purchased with MILCON funds. Free-standing equipment is purchased from other appropriations. As a general rule of thumb, appliances that are simply set in place and plugged in are purchased with equipment funds, whereas "built-in" appliances are purchased as part of the construction with MILCON funds. See Figure 22 for a typical shared kitchen.

The use of pre-manufactured unit kitchens is not encouraged unless substantial warranties are included. While they save space, they are often much more expensive to maintain than conventional appliances.

The following requirements must be met in the design of the kitchen:

- Provide a frost-free refrigerator with a separate freezer compartment. Minimum size is 0.31 m^3 (11 cubic feet). (Equipment)

- Provide a double bowl stainless steel sink. Consider using a "sink-and-a-half" design having one large bowl with a smaller bowl connected to a disposer. A disposer is recommeded but optional. Provide a gooseneck type single lever faucet. (MILCON)

- Dishwashers are not recommended but are optional if funding allows (MILCON)

• Provide at least two duplex outlets above the backspash. These outlets must be GFI if they occur within the specified distance from the sink as defined in the latest addition of the National Electric Code. These oulets are in additon to those required for the range, refrigerator, range hood, oven, microwave, or disposer.

The minimum requirement for cooking are to provide a two-burner cooktop, conventional oven, plus a wall-mounted shelf and outlet for a standard microwave oven. A self-cleaning oven is recommended. As an option, a combination microwave/ convection oven may be substituted for the standard oven and microwave. This type oven may be built-in or placed on the wall-mounted microwave shelf. (MILCON if built-in, Equipment if free standing)

• Provide a range hood with a light and fan. Positive ventilation to the exterior is required for all new construction as well as Type A (central corridor) dormitory renovation projects. Ducted exhaust hoods are recommended for Type B (balcony access) renovation projects, but ductless fans with recirculating fans and proper filters are acceptable when warranted by existing building conditions. (MILCON)

• Provide dining space for two persons in the kitchen, either at a separate table or a barstool-height counter. Configurations which force the user to face the wall are discouraged. (built-in counter would be MILCON)

• An operable window is desirable but not mandatory in kitchens.

• Provide at least 900 linear millimeters (3 linear feet) of wall cabinets in the kitchen. Also provide 900 linear millimeters (3 linear feet) of base cabinets. Provide at least 600 linear millimeters (2 linear feet) of counterspace adjacent to the sink. The countertop should have an integral backsplash. These requirements for wall and base cabinets are in addition to the microwave shelf. (MILCON)

• Provide fluorescent task lighting providing at least 75 footcandles under wall cabinets, and provide either an incandescent or fluorescent ceiling light fixture(s) on the ceiling of the kitchen area, providing between 50 and 100 footcandles ambient illumination.

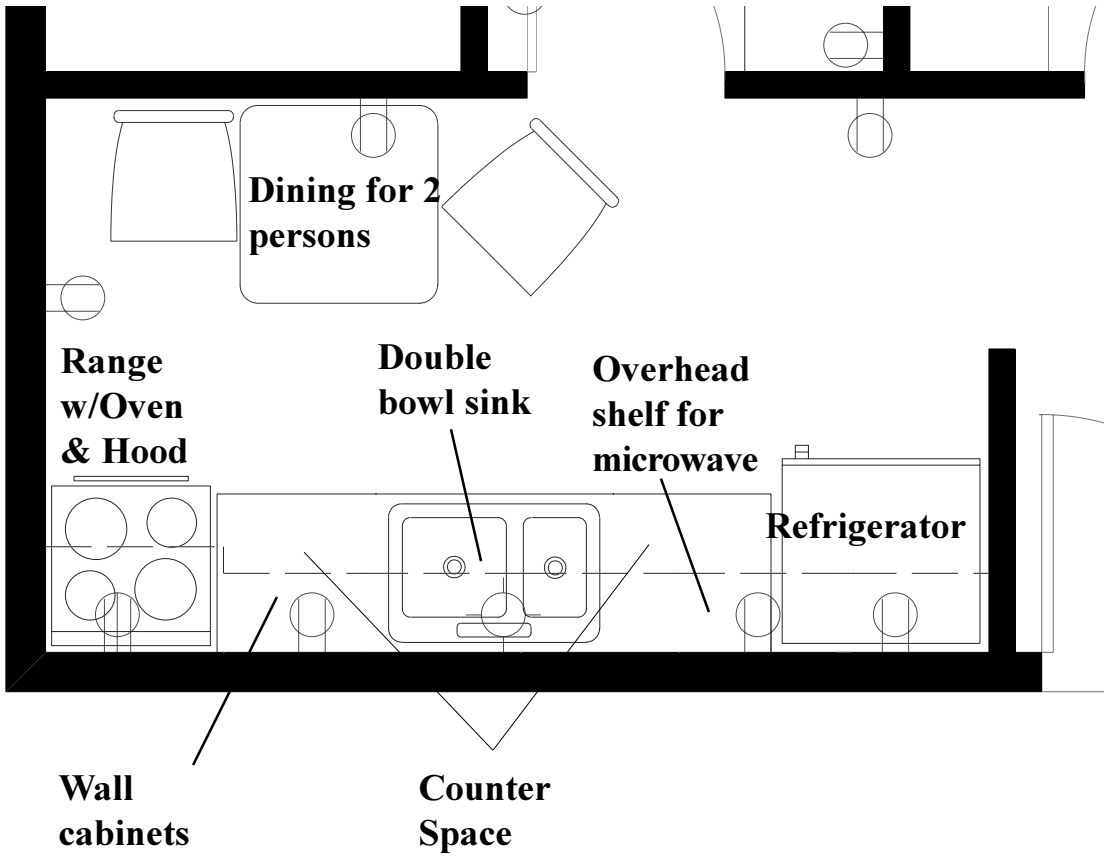


Figure 22. Typical Shared Kitchen

C. Recreation/ Community Areas

1. Consolidated Support Facilities

See Figure 23 for a typical support facility containing study/meeting room, centralized laundry, kitchenette/vending area, administration office, game room, television room, and guest toilets.

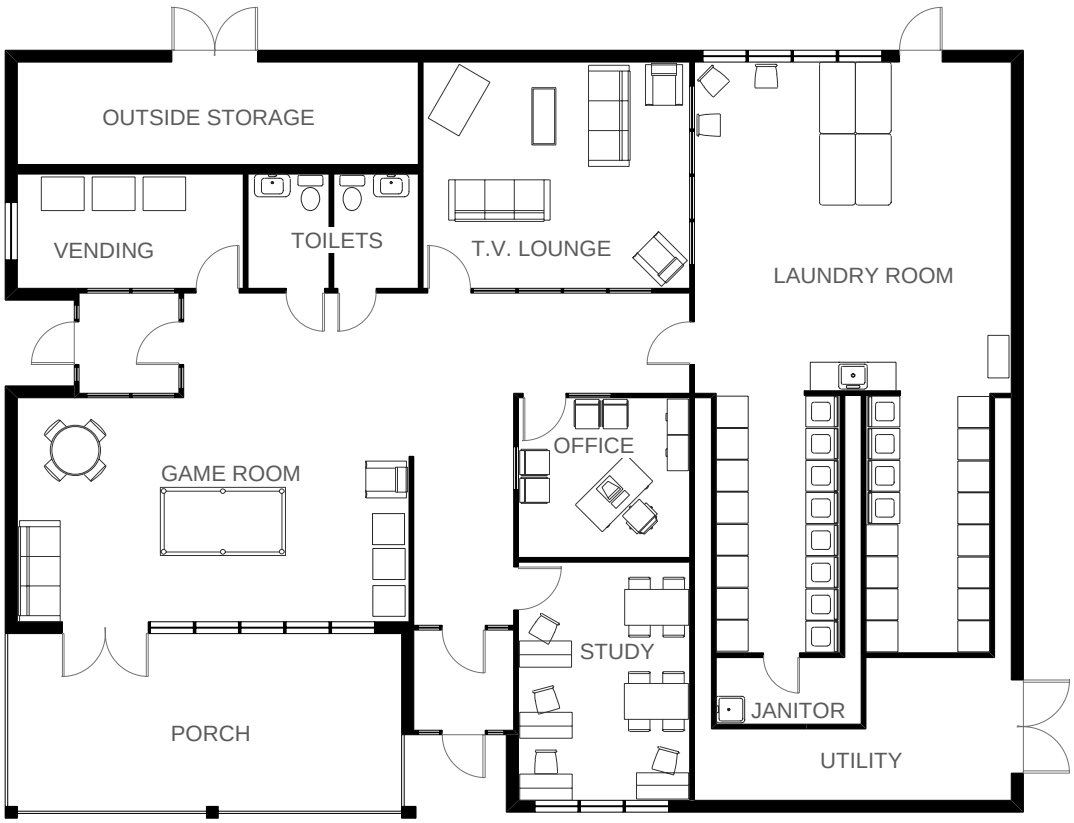


Figure 23. Typical Consolidated Support Facility

2. Multi-purpose Space and Gamerooms

Multi-purpose space includes study/meeting rooms, television rooms, workout rooms, etc. Distribute multi-purpose spaces throughout the dormitory, or consolidate them into one larger space on the first floor that allows for several uses. Consideration must be given to the location of the area to avoid undesirable noise and traffic. Plan acoustics, lighting, and furnishings to create an environment conducive to the intended activity.

Many residents own televisions; therefore, the need for a television room must be evaluated on a case-by-case basis. Provide dimmable lighting and window treatments to control glare in television rooms.

Unit commanders designing and equipping fitness rooms in their squadrons will be responsible for maintaining accountability controls, establishing use priorities, providing maintenance, and monitoring safety, security, and sanitation. Contact the Services Squadron for assistance.

Anticipate the type of activities provided in the design of game rooms. . Most game rooms are designed to accommodate pool tables and/or ping-pong tables. Some dormitories also have video arcade games located in the game room. Acoustically isolate game rooms from television rooms, residential and study areas because of the typically high noise level. Locate the game room and television room near the centralized laundry facility, the public phone alcove, and the kitchenette/vending area.

Television, workout and game rooms are often subject to hard use. Select finish materials accordingly. Provide a durable wainscot topped by a hardwood chair rail on the walls of these rooms. Avoid the use of suspended acoustical ceiling systems in game rooms as they have a tendency to be damaged by pool cues.

D. Service Areas

1. Laundry Rooms

This design guide does not dictate the distribution of laundry appliances, but does address the total number of washers and dryers to be provided. Allow one set per 12 residents. Provide one appliance, either a washer or dryer, for each six residents. This factor should be used where space permits in existing dormitories. It is mandatory for new construction. A ratio of two dryers for each washer is suggested. Additional washers and/or dryers may be provided with MAJCOM approval.

Laundry facilities may be distributed on each floor of the dormitory or consolidated in one central location. When smaller laundry rooms are located on each floor, residents feel they are more convenient, and the travel distance required to carry laundry is reduced. This arrangement, however, has some drawbacks in that noise isolation, utility service, and ease of maintenance become more difficult and typically more expensive to address. Also, residents may find themselves running back and forth between several small laundry rooms searching for an available machine, only to have one become available without their knowledge.

Centralized laundry rooms have advantages concerning easier maintenance, greater energy efficiency, easier noise isolation, and the ability for residents to quickly ascertain the availability of washers and dryers. The main drawbacks for centralization are the increased travel distance for some residents and lack of convenience.

Designers must carefully address noise isolation, acoustics, humidity, ventilation, and temperature control.

- Conceal all utilities from view, yet provide easy access. Mount utility connections 900 mm (36 inches) above the floor. Design straight-run venting of dryers to avoid lint clogs.

- Provide a minimum of two floor drains in each laundry room and at least one drain per each six washers in large centralized facilities.

- Provide at least one fold-down heavy duty ironing board in each laundry room.

- Where possible, locate laundry facilities near television and game rooms.

- For centralized laundry rooms, provide a glass storefront entry to the laundry room so that residents can view the room without entering.

- Provide dedicated space for wall-mounted laundry product vending machines.

- Provide adequate built-in folding tables and clothes hanging rods.

- Avoid an interior design scheme that creates a “sterile” look for laundry rooms. Use heavy-duty sound-absorbing finishes such as "tectum" panels and ceramic coated suspended acoustical tile.

- Provide a stainless steel deep service sink with a gooseneck fixture in the laundry room.

See Figure 24 for a typical centralized laundry facility layout.

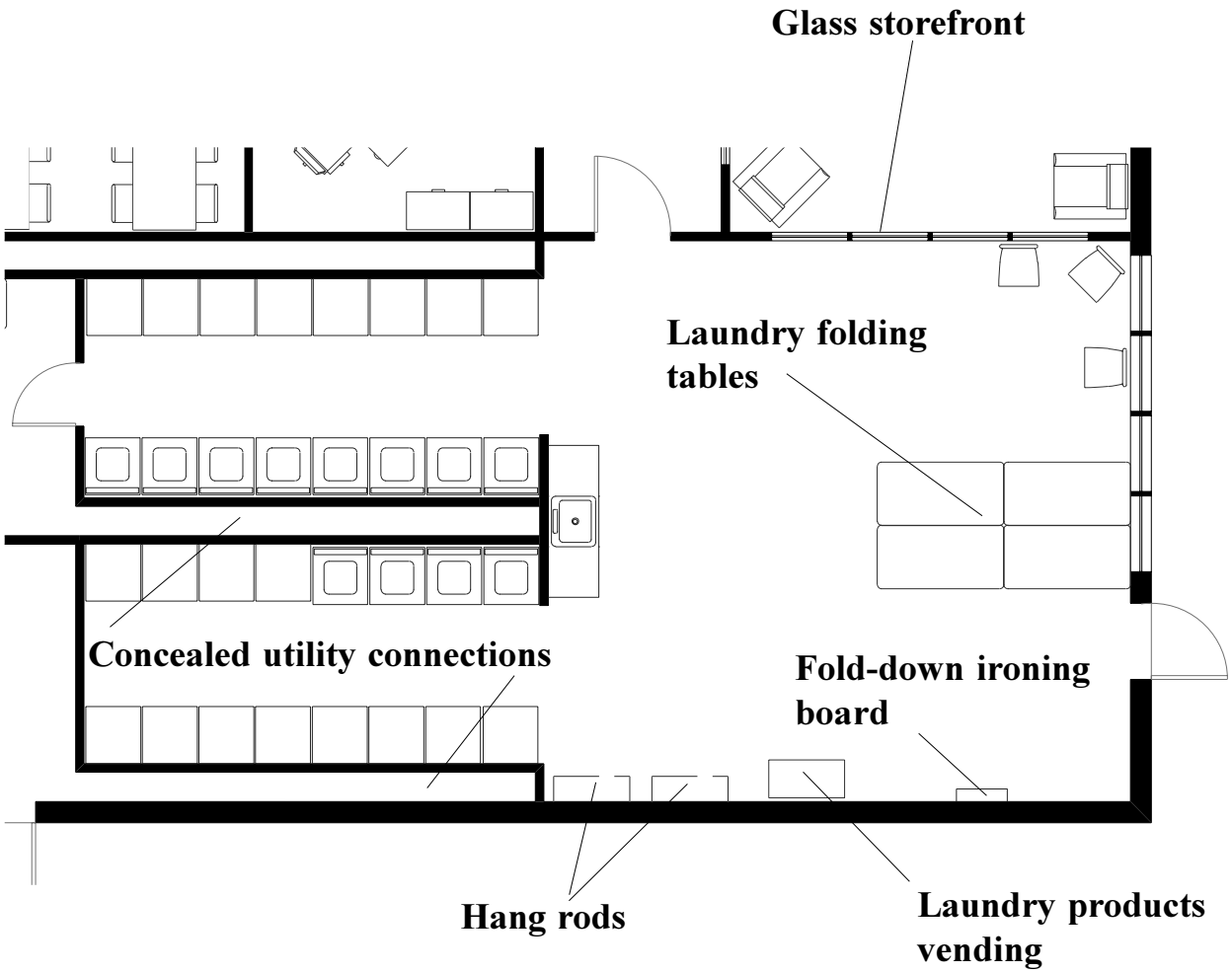


Figure 24. Typical Centralized Laundry Facility

2. Mail Service

Provide one United States Postal Service approved tamper-resistant mailbox per resident. Each mailbox must have minimum dimensions of 150 mm wide by 125 mm tall by 390 mm deep (6" x 5" x 15-1/2") and must be key lockable. Consider the likelihood of vandalism in proposed mailbox locations and design accordingly. Do not provide mail slots in individual dormitory rooms. Group the mailboxes together into one consolidated unit where space permits. The mail service may be located indoors on the first floor of a dormitory building or in an outdoor covered area, gazebo, or where quantity warrants, even a separate enclosed building.

Coordinate proposed location for mailboxes closely with base information managers, who, in turn, should coordinate with the local United States Postal Service and/or mail delivery contractors. The locaiton of mailboxes may be driven by traffic flow, building configuration, security requirements, and agreements with the USPS and/or contracted delivery services. Landscaping considerations are required for mailboxes located outside of a building.

While mail service must be relatively convenient to the residents, major emphasis must be placed on providing convenient and efficient delivery and pick up. Avoid locating boxes where residents retrieving their mail will become an annoyance to other residents. In large dormitory complexes, it may be desirable to locate several groupings of mailboxes in a number of buildings or outdoor structures. Provide overhead protection when locating boxes outdoors, and consider the impact of adverse weather on mail delivery and pick up. Provide a standard letter drop at each mailbox cluster. Parcel lockers are not required. Residents will pick up large packages at the Base Post Office.

Mailboxes added to an existing dormitory should be well-integrated into the design to appear as an original feature rather than an afterthought.

Programmers and designers should refer to HQ USAF letter, Mail Delivery Service for Unaccompanied Personnel Housing, dated 13 October 1995 for more information.

3. Vending Area

Provide a vending area near the multi-purpose spaces and/or game room on the first floor of the dormitory building or in the consolidated support facility. Provide space and utility connections for one ice machine and four vending machines. Space for additional vending machines may be provided. Size the ice machine based on 136 kg (300 pounds) for each 200 residents. For larger dormitories, vending areas may be distributed throughout the facility.

4. Bulk Storage

Bulk storage areas provide dormitory residents with additional storage space for personal items. Items typically stored in bulk storage areas include luggage, original stereo system cartons, snow tires, and bicycles. As a general rule of thumb, allow two storage cubicles for each three residents. This ratio can be changed to meet the needs of each dormitory. Each storage cubicle must have minimum dimensions of 900 mm wide by 1200 mm deep by 2100 mm tall. Construct storage cubicles of plywood or heavy duty wire mesh. Each cubicle must have a heavy-duty padlock hasp. Residents will furnish their own padlocks.

Locating the bulk storage area on the same floor as the living units they serve enhances convience, but uses expensive space for an infrequently used purpose. Consider consolidating bulk storage in less expensive construction. One large centralized bulk storage room may be provided, but it requires more attention to security and is generally less convenient to the residents. The room must have a door, but it must have 24-hour access by the residents. One large centralized bulk storage room may be provided, but it requires more attention to security and is generally less convenient to the residents. Assess the need to store special items such as chemical warfare or mobility gear, and design accordingly.

5. Administration Area

For most enlisted dormitories, the administration area consists of a single office for the facility manager. Locate this office on the first floor for the convenience of the residents and visitors. They are typically located near the main entrance to the building. Provide a recessed, wall mounted, lockable key storage box in this office for storage of spare room keys for each room.

6. Utility Space

Utility spaces include mechanical rooms, electrical and telephone closets, janitor closets, storage closets, outside storage, and supply storage rooms. Address the following:

- Locate mechanical rooms to control noise and vibration and allow for efficient utility distribution. Mechanical rooms are generally best located adjacent to laundry facilities Give special attention to the reduction of noise and vibration transfer.

- Electrical and communications rooms introduce little conflict with living units and should be located as required throughout the dormitory for efficient utility distribution.

- Plan access to mechanical, electrical, and communications rooms so that minimal disruption of residents occurs when these spaces require service. Provide access from the exterior of the dormitory whenever possible.

- Locate a janitor closet on the first floor of all dormitory buildings and on each floor of Type A dormitories. Type B dormitories require janitor closets on each floor only if public areas such as laundry rooms or television/game rooms are provided on that floor. Provide each janitor closet with a deep service sink, a mop strip, a floor drain, and wall-mounted shelves for storage of cleaning supplies.

- Provide storage closets where needed. They are most often required near public spaces such as television and game rooms for storage of game equipment, etc.

- An outside storage room is recommended for each dormitory building for storage of grounds and building maintenance equipment and supplies, such as lawn mowers, snow removal equipment, garden tools, gasoline, and paint. Determine the types of materials to be stored and design accordingly for the associated fire hazard classification and ventilation requirements.

- Provide each dormitory building with a supply storage room similar in size to one half of a room-bath-room module. This room will be used to store vacuum cleaners, linens, etc. Equip this room with a Dutch door to facilitate linen exchange. Ideally, locate this room on first floor.

7. Visitor Toilets

Provide toilet facilities on the first floor of each dormitory for use by visitors and residents. Provide convenient access to these toilets from television and game rooms and laundry facilities. Design these toilets to accommodate the needs of persons with disabilities. Provide one lavatory and one toilet in each visitor toilet. In smaller dormitories, this requirement is met with one room with a privacy lock on the door to allow use by both males and females. Use separate men's and women's toilets in larger facilities where higher use is anticipated. Provide commercial quality toilet accessories in the visitor toilets. These include a recessed paper towel dispenser/trash receptacle, toilet tissue holder, soap dispenser, grab bars, and soap dish.

8. Circulation Space

- Avoid an institutional appearance for interior corridors in Type A dormitories. This is accomplished by using wall-mounted light fixtures and wall and ceiling articulation to help alleviate the "tunnel effect" of a long corridor. Recess all wall-mounted accessories other than the light fixtures, such as fire extinguisher cabinets.

- Introduce natural light into interior circulation spaces where possible.

- Provide convenience outlets each 25 feet on center in interior corridors.

- Provide heavy-duty non-slip nosings on all stair treads to accommodate heavy pedestrian use as well as furniture movement.

- Carpet the main interior stairs. Install rubber or vinyl stair treads on other interior stairs. All stairs, including exterior stairs must have solid treads.

- Exposed duct work, conduit, etc., is not allowed. Provide utility access doors as required.

- Freight elevators may be provided if construction budget allows. Combination freight/passenger elevators are required for dormitories four stories in height or higher.

Chapter 5 - Vision 2020

A. Program Definition

Vision 2020 is an Air Force initiative that proposes new assignment and construction standards for unaccompanied personnel housing and offers investment strategies for the implementation of these new standards. The program looks toward the next century in light of changing housing expectations of our increasingly sophisticated and highly technical unaccompanied enlisted personnel.

1. Significant Changes

The Air Force is currently establishing policy to program on-base housing for all unaccompanied personnel in grades E-1 through E-4. Vision 2020 proposes that junior unaccompanied personnel would be housed on-base, and more senior unaccompanied personnel would be housed off-base when local community housing is adequate. Vision 2020 is a long-range goal intended to improve dormitory standards by first providing airmen with private rooms (1+1) on-base and eventually with private apartments by the year 2020.

2. Current Status

The Air Force emphasis is on accomplishing 1+1 standards before Vision 2020 apartments are pursued. The Vision 2020 apartment standard is not approved by the Secretary of Defense and is considered a long-range goal for unaccompanied housing well into the next century.

3. Basis of Report

The report recognizes the disparity between housing allowances provided for married versus unaccompanied personnel and cites the House of Representatives Armed Services Committee tasking DOD to "..give similar priority to barracks as it gives to family housing." Of particular note is the fact that unaccompanied members entertain and watch television in their bedroom or community area and use community laundry facilities. Married members entertain and watch television in their living room, and most have a washer and dryer elsewhere in their home.

B. The New Vision

1. Private Apartments

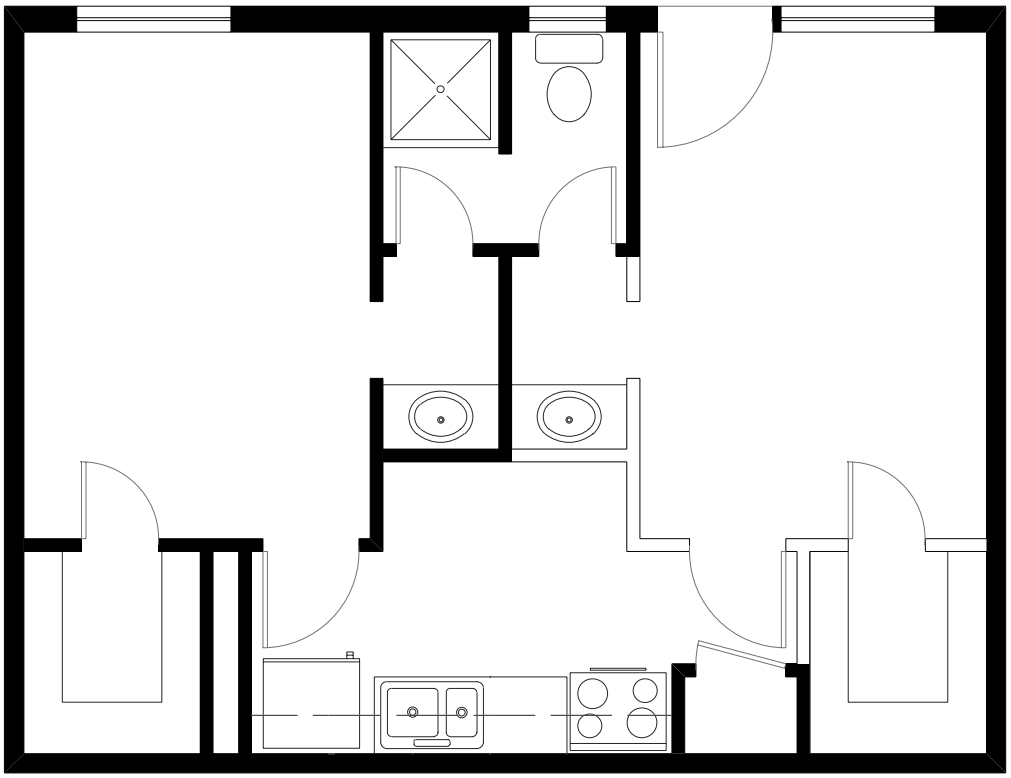
Every unaccompanied enlisted member living on-base would be provided a private efficiency apartment. This apartment would include a sleeping area, living area, a private bathroom, and in-room cooking and possibly laundry facilities.

2. Existing Inventory

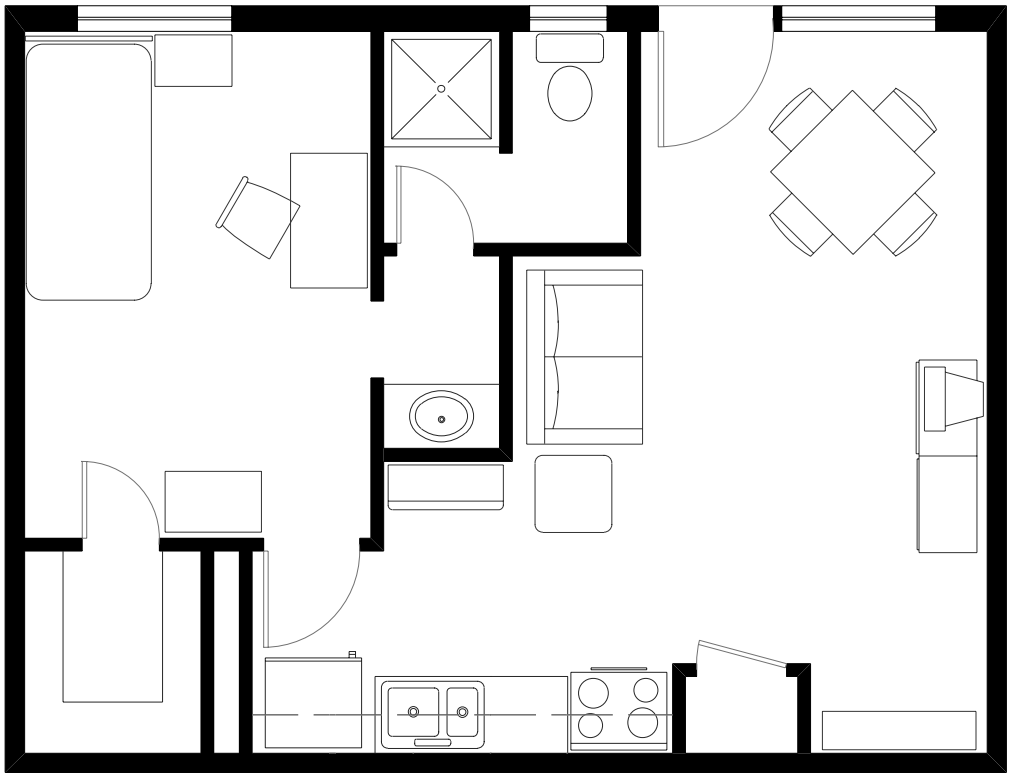
Vision 2020 recognizes the large investment the Air Force currently has in traditional 2 plus 2 room-bath-room modules. The design of the proposed apartment must allow these existing modules as well as new 1+1 modules to be easily converted into an efficiency apartment.

3. Planning for the Future

New dormitories and major dormitory renovation projects should allow for cost-effective conversion to private apartments. As an interim measure, the Air Force hopes to change the assignment standard for E-1s through E-4s to allow each member a private room with a bath shared by only one other person. See Figures 25 through 30 for typical plans to convert example room-bath-room modules to private apartments.

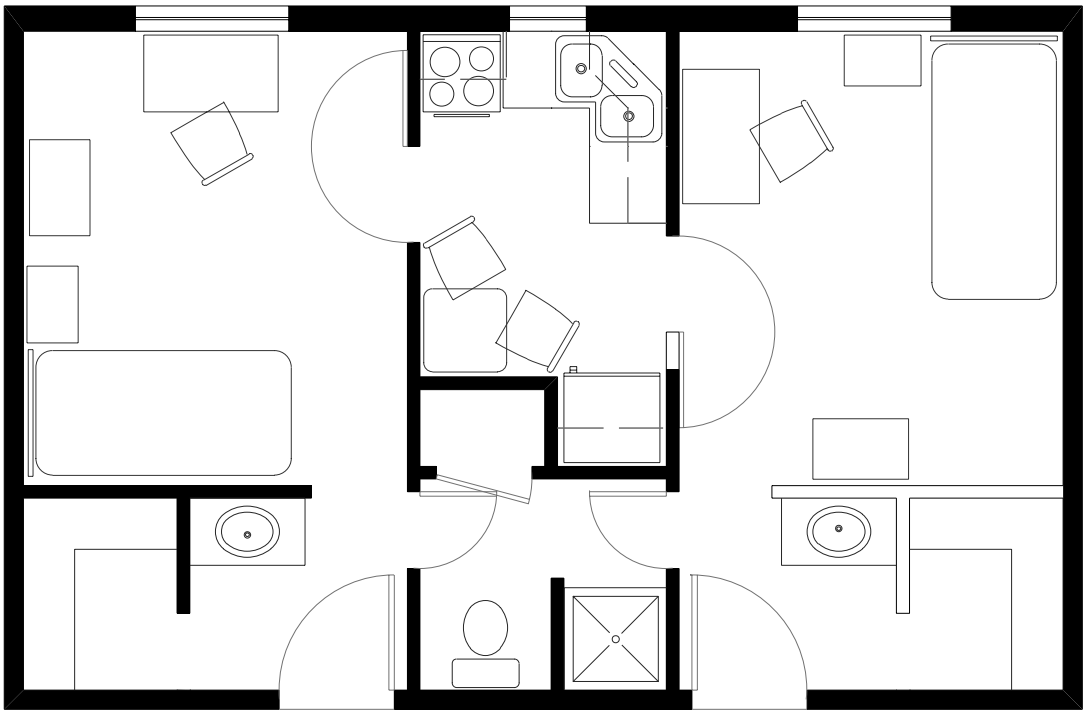


1+1 Module Demolition Plan

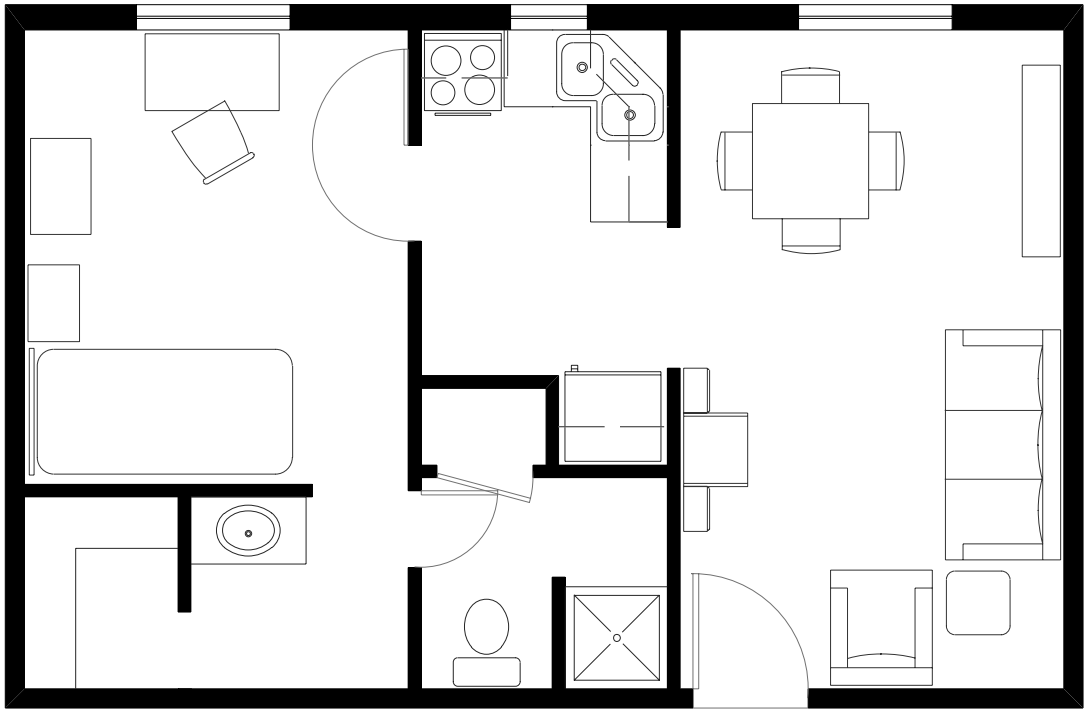


New Vision 2020 Apartment

Figure 25. Typical Private Apartment Conversion

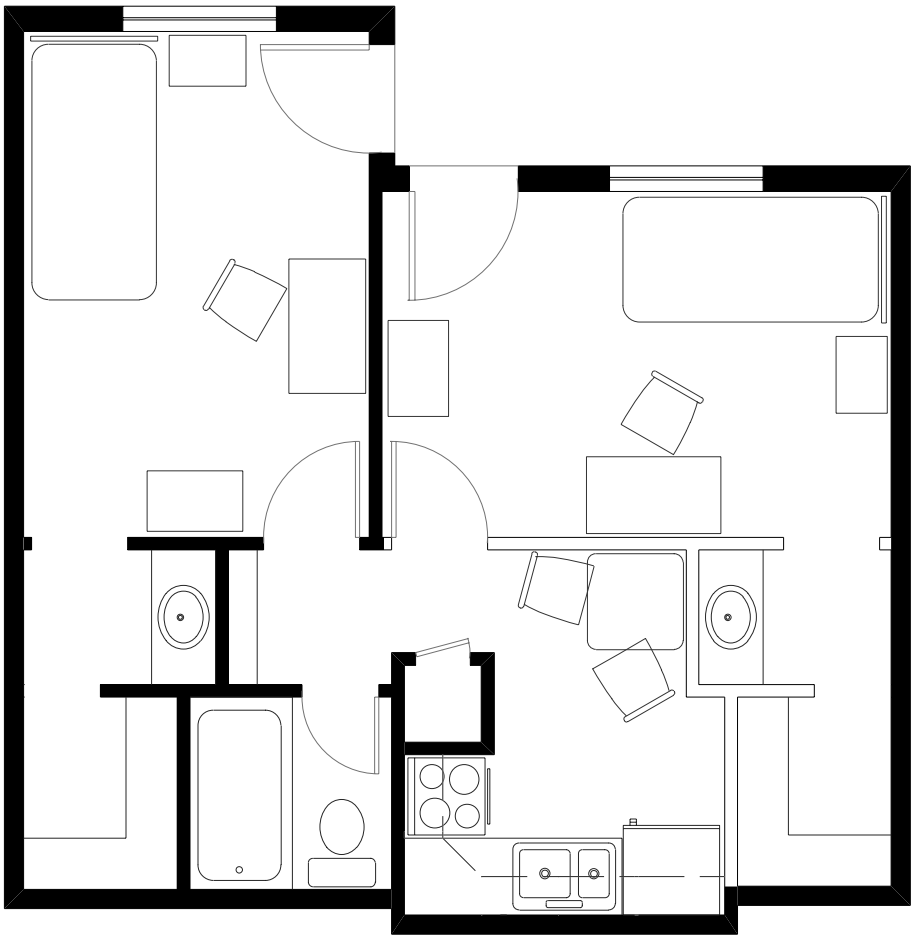


1+1 Module
Demolition Plan



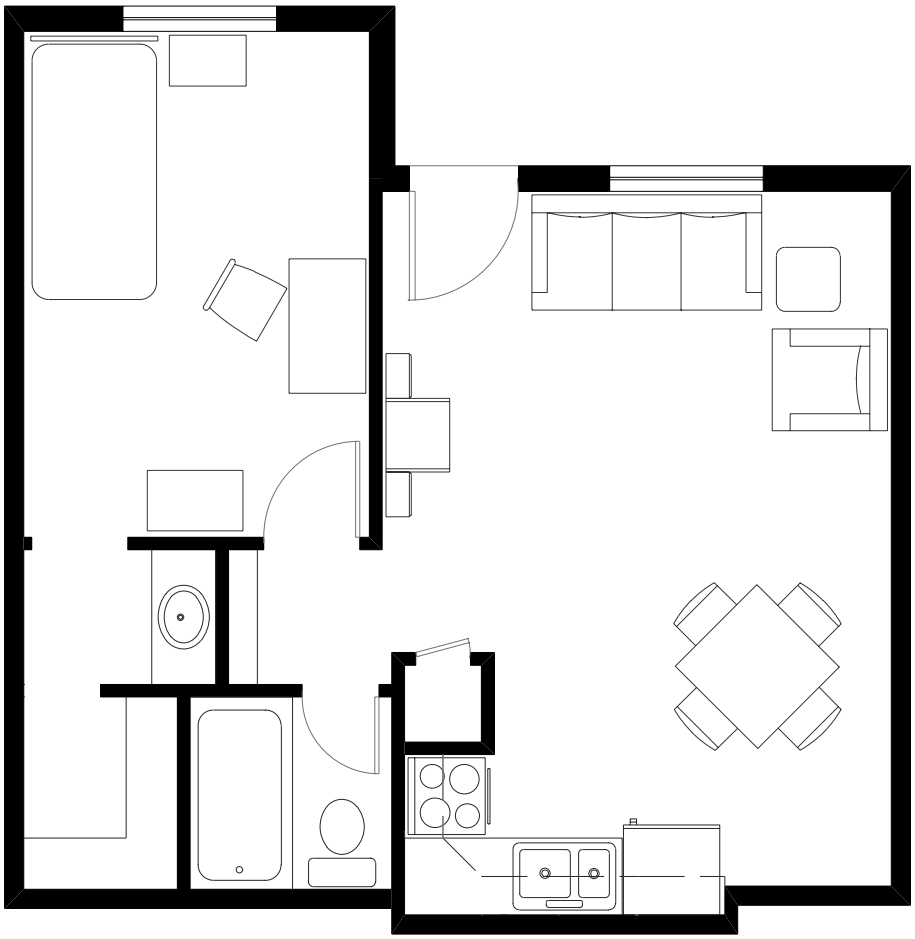
New Vision 2020 Apartment

Figure 26. Typical Private Apartment Conversion



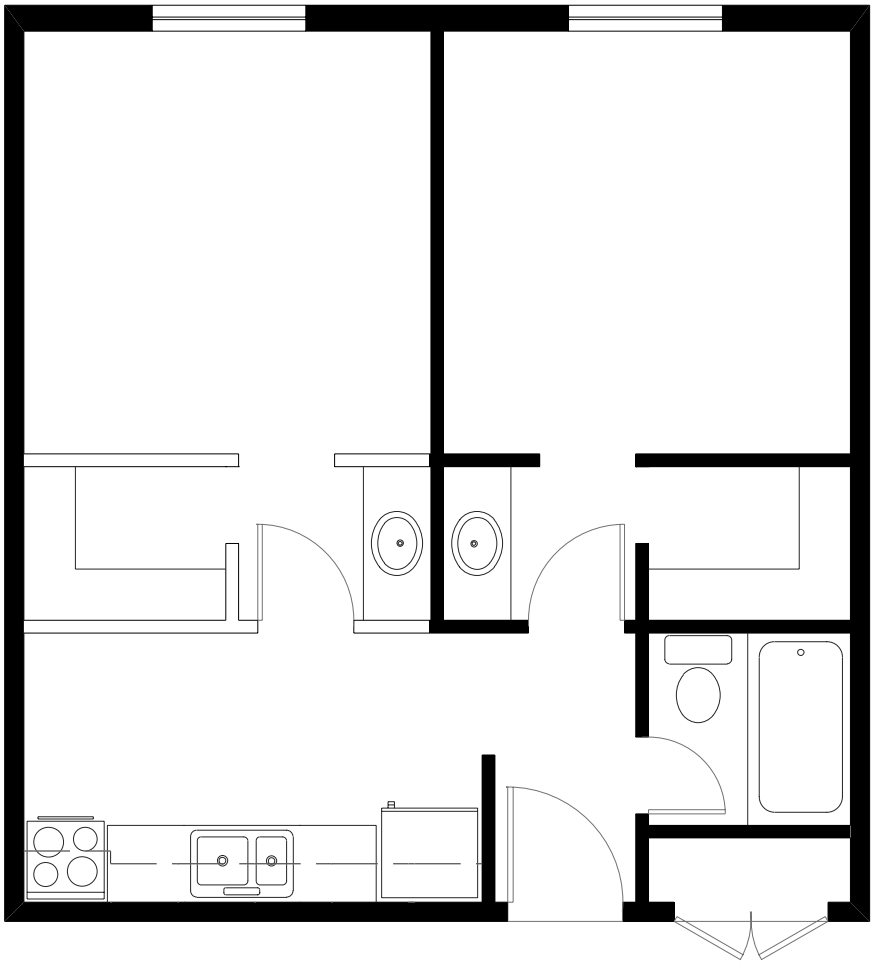
1+1 Module
Demolition Plan

Figure 27. Typical Private Apartment Conversion



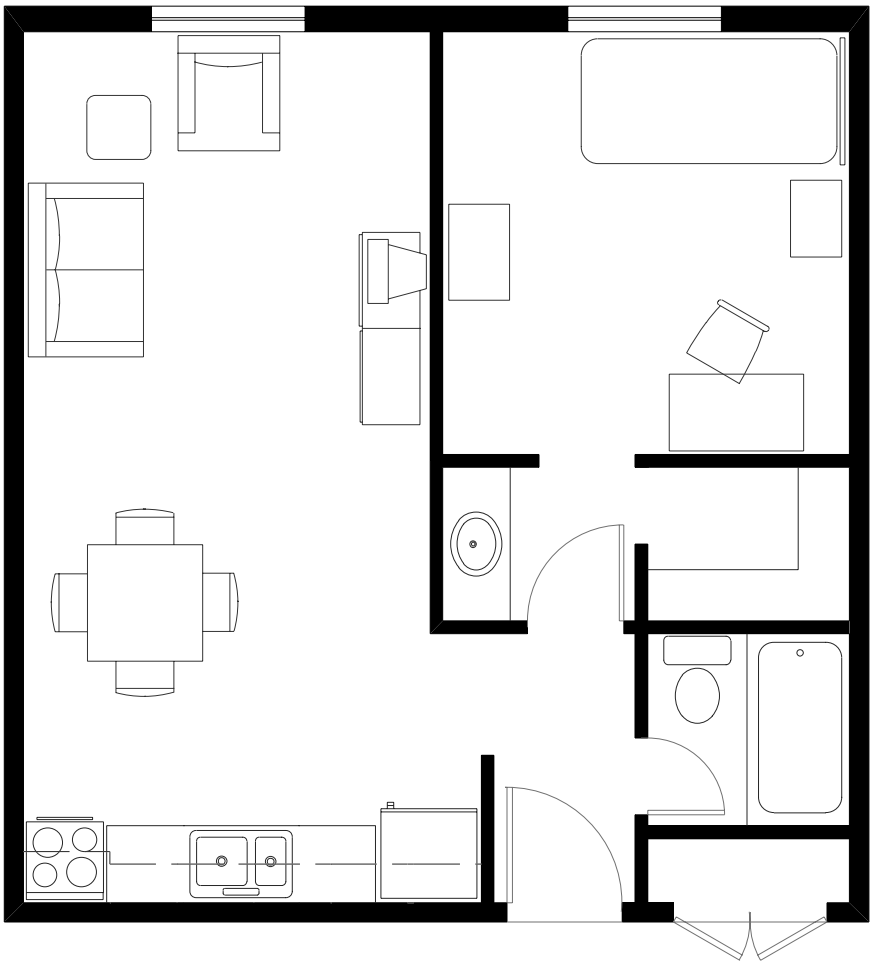
New Vision 2020 Apartment

Figure 28. Typical Private Apartment Conversion



1+1 Module
Demolition Plan

Figure 29. Typical Private Apartment Conversion



New Vision 2020 Apartment

Figure 30. Typical Private Apartment Conversion

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